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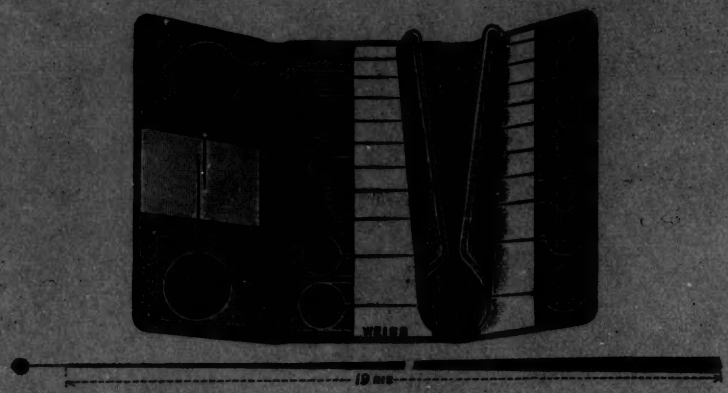

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THE BRITISH JOURNAL
OF
OPHTHALMOLOGY

APRIL, 1918

COMMUNICATIONS

ECZEMATOUS KERATO-CONJUNCTIVITIS *

The Richard Middlemore Post-Graduate Lecture, 1917

BY

ARTHUR BERNARD CRIDLAND, F.R.C.S.ED., D.O.OXON.,

WOLVERHAMPTON.

IT is first my pleasant duty to thank the Committee of Selection of the Richard Middlemore Post-Graduate Lectureship for inviting me to deliver the Lecture for 1917 and to express to them my deep appreciation of the honour so conferred, the more so as I do not practise in Birmingham.

In selecting a subject my thoughts were directed towards those in which general practitioner and specialist might find much in common, for in doing so I felt that I should be making my best endeavour to fulfil the trust bequeathed by the great oculist who founded this Lecture.

One of the commonest diseases of the eye and one with which all should be familiar is that which is now usually termed "Eczematous Kerato-conjunctivitis."

It is a common disease in more senses than one, for it is common amongst the common people.

The sight of the dirty and slatternly mother dragging two or three children equally dirty and slatternly, with eyes tightly closed

* Delivered on December 4, 1917, at the Birmingham and Midland Eye Hospital.

is, unfortunately, too familiar in our out-patient clinics, and forms a sad picture, not wholly relieved by the fact that we can do a great deal for them.

This disease, occurring as it does between the ages of two and twelve, the happy years of childhood, throws much sadness upon these young lives, to say nothing of the interference with their education and quite apart from the low standard of general health of which its presence is an indication.

Although it seldom is seen after puberty, and the majority of the eyes fortunately recover completely, yet for many the matter does not end there. The resultant scars of the cornea cause more or less permanent diminution of vision, and so prove a lasting handicap to good citizenship, whilst the worst cases may even be forced into our blind institutions.

The figures given by the late Simeon Snell show that 5 per cent. of the inmates of the Blind School at Sheffield are there on account of ulcers and other lesions of the cornea.

Those of the Blind Institute of Birmingham show that 12.5 per cent. of the inmates are blind from the same cause.

I do not wish it to be thought that I regard all these cases as examples of advanced eczematous kerato-conjunctivitis, but as the result of a recent examination of the inmates of the Wolverhampton Society for the Blind I found three cases out of 22 (i.e., 13.6 per cent.) to have suffered from corneal troubles; in two of them the evidence of scrofulosis together with the appearance of the eyes was so undoubted as to make it certain that eczematous kerato-conjunctivitis played a great part in the tragedy.

It is because this disease is so common and because its effects may be so far-reaching that I have ventured to make it the subject of this lecture.

Nomenclature

Before attempting to recall to your minds an outline of the disease some criticism may be directed towards its title, "Eczematous kerato-conjunctivitis," more particularly, of course, to "eczematous," a word for which, I believe, we are indebted to Horner, though I cannot give the reference. Other names by which it has been designated are "strumous," "scrofulous," "phlyctenular," and where the cornea alone is involved "fascicular"; of these, if we are not to accept the word eczematous, scrofulous would appear to be as good as any.

When, however, years ago Robert Koch found the tubercle bacillus in scrofulous glands, belief in the existence of scrofulosis as an entity was so shaken that medical men hardly dared to breathe the word; but of late, opinions have been modified, and in an interesting communication made to the Oxford Ophthalmological

Congress in 1912, the late Professor Straub[20], of Amsterdam, expressed himself as a believer in the existence of scrofulosis as something apart from tuberculosis, or, if a tuberculosis, certainly a distinct form; and he further showed himself a strong supporter of the reintroduction of the term, and of its applicability to this disease.

Our predecessors knew scrofulosis by its signs, although they did not possess a satisfactory theory to explain it, and the results of many generations of medical experience cannot be cast aside even by the most excellent histological and bacteriological work.

On the other hand, "eczematous" is the word found in text-books, and most commonly used to distinguish this form of kerato-conjunctivitis, and a plea for its continuance is found in the work of Sydney Stephenson[17], for in 765 cases of phlyctenular disease seen by him in three clinics for children in London, more than 63 per cent. showed eczema of the skin. He also found analogous changes in mucous membranes other than the conjunctiva, as, for example, those which line the nose, mouth, and palate, and he argued that the existence of such changes strengthened the view according to which phlyctenular disease was believed to be eczema of the conjunctiva. He concluded that phlyctenular disease was due remotely to the tuberculous diathesis and immediately to an eruption of eczema or impetigo upon the surface of the eyeball.

Against this it has been established by Weekers[22], of Liège, that the ocular phlyctenule is something quite different from the vesicle of eczema, so that, histologically, eczematous is not a true descriptive title to apply.

For the same reason phlyctenular is incorrect, for does not *φλύκταινα* the Greek derivative signify a vesicle, whilst the sub-epithelial nodule which it is intended to describe is an efflorescence which is never a vesicle?

There appears to be no good reason why we should not revert to the old term "scrofulous." The word "scrofula" itself, meaning as it does "a little pig," is one which must appeal to all, for how many do we not see suffering from this form of kerato-conjunctivitis who resemble that plain though useful animal. There appears to be only one objection to the term, and that from the patient's point of view, for is it not almost a term of opprobrium to call a patient "scrofulous," or to tell parents their children are so?

Clinical Picture

Although the clinical picture of scrofulous kerato-conjunctivitis is one which is very familiar to us all, it is necessary to take a brief glance at it.

The essential feature is the presence of the efflorescence, or so-

called phlycten, on the conjunctiva or cornea, and very frequently at the junction of these two structures.

Discrete in character, it never involves more than a portion of the surface of the conjunctiva, and so, unlike a diffuse inflammation of that membrane, it is not in its pure form accompanied by an abnormal secretion.

Just as the follicle and the process of contraction are clinically diagnostic in trachoma, so the nodules form clinically the fundamental characteristic in scrofulous kerato-conjunctivitis, but the nodules differ in appearance as these are situated on the conjunctiva or the cornea.

Considering the conjunctiva first, the simplest type of the disease is represented by the solitary efflorescence at the limbus, which appears as a round or oval whitish-grey sub-epithelial nodule as large as a pin's head with some hyperaemic vessels arranged in triangular form, the nodule being at the apex, and the rest of the conjunctiva being perfectly well.

There may, however, be two or three, each with its corresponding patch of injection, and when they are more numerous the whole globe may appear reddened.

The more numerous they are the smaller they are, so much so that the entire limbus may present a raised granular appearance with much conjunctival injection—a condition sometimes described as "sand-grain efflorescences."

The single efflorescence may appear at some distance from the limbus and is then distinctly large, more obstinate in its course, and takes longer to clear up.

Occasionally the efflorescences appear near the margins of the lid, as has been especially noted by Stephenson.

When the cornea is involved, i.e., when the condition may be described as *keratitis* eczematosa or scrofulosa, four distinct clinical pictures are produced which may be present either singly or in various combinations. These fundamental types are:

1. Eczematous infiltration.
2. Round eczematous ulcer of the cornea.
3. Eczematous ulcus migrans or fascicular keratitis.
4. Eczematous pannus.

1. In the first type, *eczematous infiltration*, the condition may be otherwise described as a marginal keratitis, for the nodules occur at the margin of the cornea and may be single or in great numbers.

They are very common, and, as in the conjunctival condition, they may vary in size and number.

Sometimes the whole surface of the cornea is studded with very small ones, causing minute losses of substance after the epithelial covering has broken down.

They are the same as the sand-grain efflorescences of the limbus

and in the initial stage the cornea looks as if it were sprinkled with sand.

On account of the irritation of the terminal filaments of the nerves of the cornea, much photophobia and blepharospasm are set up, making examination exceedingly difficult.

2. *Ulcus eczematosum.*—This is a round or oval ulcer which may appear in any part of the cornea and represents an advanced stage of the eczematous nodular infiltrate in which the process is more malignant.

The infiltration rapidly becomes purulent, assumes a yellowish, almost pustular, appearance, and produces ulceration. Iritis usually co-exists.

This ulcer has a characteristic tendency to perforate the cornea, and in its most acute stages is not infrequently accompanied by hypopyon or pus in the anterior chamber; this is, I think, due in many cases to a secondary infection with micro-organisms, although presumably the intensity of the toxin, whatever it may be which gives rise to the ulcer, is sufficient cause in itself.

After perforation, the iris is often seen to be adherent to the back of the cornea and the condition known as leucoma adherens follows, usually with a deplorable interference with vision as a sequel.

As a rule one eye alone is so affected.

3. Eczematous ulcus migrans or *fascicular keratitis.*

The appearance which this type presents is that of a crescentic efflorescence on the cornea with small blood-vessels running to it.

The infiltration is formed primarily at the margin and breaks down into an ulcer in which vessels extend from the margin.

The peripheral portion heals, but on the opposite side the ulcer spreads towards the centre of the cornea pushing before it its infiltrated edge, the grey crescent.

As the infiltration and subsequent breaking down extend, the vessels follow, and a narrow groove is formed which is filled by them.

The course is slow, often lasting for weeks, while the ulcer may extend to, and even beyond, the centre of the cornea.

It remains superficial and never perforates, but it leaves a permanent narrow cicatricial band of opacity, which may sometimes be forked, showing that the ulceration has advanced in two divergent directions.

The interference with vision which inevitably follows corresponds with the density and site of the opacity.

The appearance and behaviour of this form may be likened to that of a comet rushing across the sky.

4. *Eczematous pannus.*

In this last form the whole or greater part of the cornea is reddened by a superficial vascularisation with its typical ramification.

Numerous superficial infiltrations appear in the cornea, soon become confluent, and give rise to the great vascularization, the cornea being cloudy between the vascular twigs.

So it is seen that there are about nine different types of scrofulous kerato-conjunctivitis; they are not met with, however, in such distinctive forms, but usually combined in various ways.

Thus marginal efflorescences with leucomata, infiltrates, and ulcers are seen in one cornea, pannus and conjunctival efflorescences in another, and so on.

The histological changes are as follows:

On the conjunctiva there are three stages through which the efflorescence passes; the stages of infiltration, ulceration, and cicatrization.

1. *Stage of infiltration.*—The conjunctiva presents dilatations chiefly of the lymphatic vessels, diapedesis of leucocytes, and serous transudations into the interstices of the conjunctival tissues. The epithelium shows leucocytes on the surface, a thickening and degeneration of certain cells. together with the formation of vacuoles filled with serum. Towards the centre of the nodule the leucocytes are principally polymorphonuclear, whilst those around are chiefly mononuclear. The blood-vessels in the neighbourhood are dilated and their endothelium shows proliferation.

2. *Stage of ulceration.*—Prior to ulceration, the epithelium becomes raised and attenuated. As a rule, the ulcerations appear at several points. Sometimes the epithelium may disappear completely, or, on the other hand, it may disappear only from the summit of the phlyctenule. Beyond the ulcerated part, the epithelium is infiltrated and shows here and there vacuolation of its cells. At other places it may be thickened and proliferating. The base of the ulcer is occupied by masses of polymorphonuclear leucocytes covered with fibrin. The conjunctival cells are frequently degenerated. The vessels have become greatly dilated, their endothelium has proliferated, and a large number of plasma and basophile mast cells have made their appearance.

3. *Stage of cicatrization.*—The epithelium proliferates abundantly, and shows prolongations. Karyomitosis can be recognized in the superficial strata. Fissures form between the superficial necrotic layers and the deeper sound layers. Numbers of fine new vessels with proliferating endothelium appear in the sub-epithelial tissue, and scattered among these are large numbers of mast cells with remains of the mononuclear and polymorphonuclear exudation. Finally, infiltration is replaced by connective tissue fibres.

Occasionally, instead of an ulcer forming, the cavity becomes lined by epithelium growing down over its surface, and a cyst results.

Phlyctenulae occurring in adults, those supervening during the

course of a microbic conjunctivitis, and those complicating an ophthalmo-reaction due to tuberculin, possess the same histological structure.

In the cornea the same three stages can be recognized, modified only by the structure of the tissue itself, and the histological changes seen in each stage are similar to those of the ordinary corneal ulcer arising from other causes.

As is well known, the disease is one of childhood, appearing at latest at puberty, although it may be seen later in those who have previously suffered from it; I can recall quite a number of cases of phlyctenular conjunctivitis somewhere about the age of 40, but I do not remember seeing one later than at 47. Most commonly it is the single phlycten which occurs in adults.

The great tendency to relapse, the presence during the attack of photophobia, blepharospasm, and an increased lacrymal secretion, especially when the cornea is involved, inflammation of the lid margins with the excoriations at the outer canthi, all these are features so well known as to require no further comment.

Occasionally, a considerable amount of general conjunctival congestion, with discharge of muco-pus, is seen associated with the phlyctenular condition, and this must, in my opinion, be regarded as an added infection from micro-organisms, and the treatment be modified accordingly.

The appearance so presented must not be confounded with that seen during the course of an attack of acute conjunctivitis due to the pneumococcus or Weeks's bacillus or the Morax diplobacillus, when typical phlyctenulae may be seen at the limbus; these clear up with no other treatment than that directed against the infection, and the explanation of their presence by most authors is that the micro-organisms have fallen upon scrofulous soil.

Diathesis

Eczema is found in a great number of cases, as mentioned before, and this, together with, in so many cases, the "little pig aspect" of the patient, brings us to the diathesis which is so frequently present as a background to the ocular signs.

Broadly speaking, two types may be seen, the torpid and the erethistic.

In the torpid type the children appear coarse and bloated, with pale skins, thick noses, puffy lips, short thick necks, and are slow mentally and physically.

In the erethistic or nervous type, the children are of slight build, lacking in subcutaneous fat, but with good mental capacity; their skins are pale, but flush easily.

A characteristic feature of both is the enlargement of the lymphatic glands, especially in the torpid type.

A tendency to catarrh of mucous membranes in general is found, rhinitis especially is common, whilst the frequent accompaniment of adenoids and enlarged tonsils is well known. In addition, catarrh of the Eustachian tube and middle ear may be present.

Digestive troubles are extremely frequent on account of irritability of the mucous membrane of the intestinal tract.

Lastly, secondary anaemia is not uncommon.

This, then, is the clinical picture of the disease which, in a greater or lesser degree, we usually find set in a scrofulous frame.

Before bringing before you a review of the various theories on the aetiology of the condition, I wish to say something as to its frequency.

Incidence

At the outset the statement was made that the disease was a common one, and when I chose it as my subject I believed that it was very common. This statement needs qualifying, however, for with an open mind I have endeavoured to obtain some idea as to its incidence in various parts of the country, and the statistics show that it is much more common in some than in others.

This may be already an established fact, and on the grounds of the loose expression "bad housing," might well be thought to be so, but I have not seen any comparison of figures which proves it.

I will avoid figures as much as possible and will simply give the percentages of cases of the disease which have occurred amongst the out-patient clinics of various hospitals, excluding the "accident" cases.

No case diagnosed simply as corneal ulcer was taken, although, doubtless, a number must have been of the eczematous type.

Working upward from the South they are as follows:

Plymouth.—1·42 per cent. for one year, 1916.

Exeter.—1·54 per cent. for one year, 1916.

Southampton.—1·98 per cent. for one year, 1916.

Bristol.—3·23 per cent. for one year, 1914.

Oxford.—1·2 per cent. (average for past 12 years).

Birmingham.—3·01 per cent. for one year, 1916.

Wolverhampton.—7·84 per cent. (average for past 35 years).

Shrewsbury.—2·53 per cent. for 1 year, 1916.

Manchester.—3·13 per cent. (average for past 25 years).

Sheffield.—4·76 per cent. (average for 1912).

Sunderland.—8·82 per cent. for three years, 1912, 1913, and 1916.

Glasgow.—7·54 per cent. for one year, 1916.

In a few towns and cities where I have been unable to get any statistics, I have obtained an expression of opinion from the following ophthalmic surgeons:

Margate. I chose Margate especially for, as is well known, it is

a place which attracts, by reason of its climate, numbers of young sufferers from surgical tuberculosis, and I thought it would be very interesting to know something of the frequency of the disease amongst them.

Dr. G. F. C. Wallis, to whom I wrote, is the ophthalmic surgeon attached to the Royal Sea Bathing Hospital for surgical tuberculosis and he kindly replied as follows: "I am afraid I cannot give you any hospital statistics, because those of the Royal Sea Bathing Hospital (for surgical T.B.), to which I am attached, only refer to the general condition. I think I can safely say, however, that I have seldom seen so little phlyctenular keratitis or conjunctivitis either in hospital or private life as in practice here: whilst in normal times I should think there is more tuberculous trouble of all sorts —glands and joints in particular, but also phthisis—treated in the district than in any other in the kingdom. I have always looked upon the whole régime of the general treatment adopted as an efficient preventive of this ocular affection."

I may say that I had quite an open mind as to what might be the frequency of the disease in Margate, and I think that Dr. Wallis's remarks are of much interest.

Newport. Captain R. J. Coulter kindly informed me that he thought the condition fairly common.

Leamington, Coventry, and Birmingham. Of these towns and cities Mr. T. Harrison Butler says "It is common in Birmingham, less so at Leamington and much less so at Coventry."

Norwich. Mr. Johnson Taylor writes that he would not say eczematous kerato-conjunctivitis is very common in the City and he attributes it to the fact that Norwich, called "The City of Churches and Gardens," is open, and that Norfolk is a dry county.

My own statistics in *Wolverhampton* extend over a period of 35 years and actually give the highest percentage of any except one, so that you will see I had reason for believing that, according to my own experience, the disease was a distinctly common one.

During these 35 years there has been a variation of the yearly percentage from 3·32 per cent., which occurred in 1909, to as much as 15·41 per cent. in 1897, the latter occurring in a series of high percentages extending over the seven years from 1892-1898 inclusive, when all were well over 10 per cent. Curiously enough, the two highest annual percentages, amounting to just over 4 per cent. each, which occurred in the Manchester series of 25 years, took place during the same years.

This series stands out from amongst the other years so prominently that one is tempted to look for a special cause to account for it, and a feasible one being the weather I looked up the weather records for those years.

Beyond, however, the fact that 1893 was a year of maximum

sunspots, whilst 1896 showed a predominance of N.N.W. wind, nothing out of the average was found either in rainfall, temperature, wind, earthquake or other phenomena. The weather records consulted were those made of the district from 1874-1900; incidentally the author of the work had once been a patient of the late Richard Middlemore.

The *Sunderland* figures are those for in-patients only, and it might be thought that they ought not to be compared with those of out-patients; since, however, they closely correspond with my own in-patient figures, and the two hospitals are nearly the same size, I felt justified in including them.

Opinions are of course of less value than actual figures, but I am most grateful to the above gentlemen who have been good enough to express them, and I cannot let this opportunity pass without tendering my cordial thanks to those who have so kindly assisted with figures; I allude specially to: Mr. J. Gray Clegg, of Manchester; Captain P. H. Adams, of Oxford; Mr. A. C. Roper, of Exeter; and Major G. H. Pooley, of Sheffield. The help of all has been most valuable.

The other results were obtained by an examination of the Reports of the various hospitals.

What conclusions may be drawn from such statistics as these?

The figures are not so divergent that a definite deduction can be made at once, and yet there is sufficient variation to merit more than a passing consideration.

At first glance it seems that the south country towns are more free than those more northern, as probably most people would think, and to some extent this is so, for the first towns mentioned, namely, Plymouth, Exeter, Southampton, etc., showed very low percentages.

Against temperature as a factor, however, we have the evidence of Colin, of Nice, who in 1910 stated that he found the disease very common in that health resort, putting it down to "bad housing" amongst the Italians. I am not able to give you any percentage of the incidence. And again, Bristol, Birmingham, and Manchester are within 0·1 of each other in the percentages found, and the difference in temperature in the three cities is well enough known to all.

If, however, we take them in three groups, according to nearness of percentages, we find we have:

Group 1. Plymouth, Exeter, Southampton, and Oxford all under 2 per cent. and averaging 1·5 per cent., and to these we can add Norwich and Margate, where the disease is said to be not common.

Group 2. Bristol, Birmingham, Manchester, and Shrewsbury all between 2·5 per cent. and 3·23 per cent. and averaging 2·9 per cent.

Group 3. Wolverhampton, Sheffield, Sunderland, and Glasgow all between 4·7 per cent. and 8·84 per cent., Sheffield only being the former, the average being 7·24 per cent.

Now, if on a map of England a line be drawn from Plymouth to the Wash a Southern area is cut off which includes Group 1, and is a part of the country where, with the insignificant exception of the Kent field, no coal is found.

In Group 2 the towns and cities are all close to, but not actually on, coal-beds, or if they are the bed lies extremely deep.

In Group 3 all are situated on coal-beds, practically the centre in each case, and as stated the percentage in each is strikingly high.

I suggest, therefore, that broadly the disease is distinctly more common in towns and cities where coal is found immediately beneath the surface than in those otherwise situated.

Where there is coal there are also iron-works, and it may be that the nature of this industry is a factor—in fact, a number of ideas spring to one's mind in seeking an explanation of the difference in the above figures. To mention a few: dust and smoke in the air and the prevalence of spitting, the health of the miner, the health of the iron worker, the clay soil, the rawness of the climate where coal is found, the effect of high wages and alcoholism, etc.

"Bad housing" alone, however, cannot explain the differences, for no one who knows them will contest the fact that the slums of Plymouth can hold their own in undesirableness with those of Bristol, Birmingham, Wolverhampton, Glasgow, etc.

In attempting this investigation it had been in my mind to compare the frequency of eczematous kerato-conjunctivitis with that of surgical tuberculosis or of tuberculosis in general, for the close relationship between the two is well established in the majority of cases, but strange as it may sound I am given to understand on good authority that there is no information as to the relative incidence of any form of tuberculosis in different parts of this country other than might be obtained by enumerating the deaths from phthisis.

Surgical tuberculosis is common in Wolverhampton and I am informed that it is so in Glasgow.

Probably it will be found that its frequency corresponds to a large extent with that of eczematous kerato-conjunctivitis in the towns and cities to which I have previously referred.

I cannot help feeling that such statistics would be of value and are needed, for if a disease is found to be more common in some districts than in others, there must be one or more conditions to account for it, and it naturally follows that those are the districts in which investigation is best made and the disease itself most successfully attacked.

I therefore very respectfully hold out these small beginnings to

investigators of tuberculosis and say: "Here and there, as the case may be, you will find eczematous kerato-conjunctivitis in plenty, an acknowledged finger-post to the presence of the tubercle bacillus; search the conditions under which life is carried on in those districts and so you may perhaps add another proof to the old adage 'prevention is better than cure.'"

Incidence among Healthy Children

Owing to the kindness of Dr. J. Priestley, Senior School Medical Officer of Staffordshire, to whom I am greatly indebted, I am able to present to you statistics from another point of view, namely, that of the occurrence of the disease amongst apparently healthy children or rather children who are well enough to attend school.

Dr. Priestley has given me the figures obtained by an examination of 8,575 children made up of, roughly, an equal number of boys and girls and all between the ages of 5 and 6, the first period in school life when these children are examined.

Excluding refraction cases, there were 126 cases of external eye disease amongst the boys, and 155 amongst the girls, 281 all told.

Dr. Priestley says that this is in accordance with his usual findings, namely, that eye diseases, including visual defects, are more common amongst girls than boys.

Amongst these 281 cases of miscellaneous external eye diseases there were 8 cases of phlyctenular disease in boys, and 14, including one case of staphyloma, in girls, the percentage being 6·45 per cent. and 9·09 per cent. respectively, or a total of 7·77 per cent., a high figure considering that coarse refraction errors were excluded. The remainder included many cases of blepharitis and catarrhal conjunctivitis, and also 14 cases of corneal opacities, and it is probable that a percentage of these, especially the opacities, were of the eczematous type.

Amongst these eye cases, as a whole, "bad housing," as evidenced by overcrowding, neglected and dirty clothing, and personal uncleanliness, seems to have had little influence, as the proportion of these amongst the entire group of children was but little different from that amongst the eye diseases, and amongst the phlyctenular cases the proportion was as follows:—

Overcrowding—i.e., a family living in a three-roomed dwelling.—Not a single case of phlyctenular kerato-conjunctivitis came from such a dwelling. The usual proportion amongst the entire groups examined was 7.7 per cent.

Neglected and dirty clothing.—One case, or 7 per cent., amongst the girls and none amongst the boys. In the total groups there are 5 per cent. girls and 8 per cent. boys.

Personal uncleanliness.—No case amongst the boys, but five of the girls were unclean, or 35 per cent. The usual findings in entire

groups were boys 12 per cent., girls 40 per cent. The difference is accounted for by the state of the head, the long hair of the girl being doubtless the reason.

As regards the general health of the 281 eye cases as indicated by the state of nutrition, it was found that there was nearly twice the amount of malnutrition amongst them as in the entire group of children, and that in the phlyctenular cases there occurred three amongst the girls, or 21.4 per cent., and four amongst the boys, or 50 per cent. The averages of malnutrition in the entire group were girls 14.5 per cent., boys 15.2 per cent.

It is clear, then, that these phlyctenular cases showed an excessive proportion of malnutrition.

Dr. Priestley comments as follows :

" Allowing for the very small number of cases, 14 girls and 8 boys, it would seem that narrow houses and incidences of personal neglect, uncleanliness, etc., which we associate with poverty, had unexpectedly small influence in inducing kerato-conjunctivitis ; but that malnutrition (which I am convinced generally means *disease* and not lack of nourishment, bad food, stuffy bedrooms, etc., as is so often assumed) had a great deal to do with it."

(The incidence, according to geographical distribution into North, Mid, and South Staffordshire, showed such little variation as to call for no comment.)

An interesting finding was that among the total 8,575 children there were 59 with definite tuberculous disease, and yet not one of these tuberculous children was found in the group of eye disease cases.

The investigation of these figures, small though they are, goes to show: (1) the high frequency of mild cases of the disease in Staffordshire ; (2) " bad housing," as expressed by overcrowding, personal uncleanliness, and dirty clothing, has but little effect as a causal factor, a finding which agrees with my investigations as to the comparative incidence in various large towns ; (3) malnutrition is a frequent association, but whether it is cause or effect in the evolution of the disease must be an open question at present.

I may say that I had an entirely open mind as to what might be found when I enlisted Dr. Priestley's kind help. I think that the results are distinctly interesting and open up paths along which it would be well worth while to proceed further and so enable us to throw more light on the still somewhat obscure aetiology of this disease.

Aetiology

The aetiology of eczematous kerato-conjunctivitis has received in the past twenty years more consideration than formerly.

Most of the work done has been in the direction of trying to

show the close relationship between it and tuberculosis, and the generally accepted opinion is that the phlycten is the ocular manifestation of a toxaemia arising from a tuberculous focus situated somewhere in the body.

The proof is almost complete but some of the links in the chain are wanting.

It is well established that the phlycten itself is not a true tuberculosis, for no tubercle bacilli alive or dead have ever been found in one; in fact, no micro-organisms have ever yet been found to exist in them, though they have been specially looked for by many investigators.

There is, however, a good deal of evidence to show that a tuberculous focus exists somewhere in the body in many cases.

Nias and Paton[14] stated in 1906 that as a result of the examination of 50 patients suffering from phlyctenular disease the opsonic index was lowered for tubercle, and rose as the lesion improved, and they concluded that the phlyctenules were caused by attenuated or dead tubercle bacilli.

In 1910 Stephenson and Jamieson[19] found that in 20 children suffering from phlyctenules, 50 per cent. showed clinical signs of medical or surgical tuberculosis, whilst 75 per cent. gave a family history of tubercle, and all the 20 cases reacted positively to von Pirquet's test; and, again, Stephenson[17] found that in 669 cases with phlyctenular affections tubercle was present in 31·98 per cent.

Bywater,[3] of Preston, in the same year found that Moro's test was positive in every one of 12 cases, and later in the same year repeated the test in all, and in three others besides, but with bovine tuberculin instead of human; in 13 out of the 15 the test was positive.

Harrison Butler[2] in 1913, stated that he regarded phlyctenular ophthalmia as being the result of a tuberculo-toxaemia, and that a tuberculous aetiology was exceedingly probable in 70 per cent. of his cases.

In 1912, Belenky-Raskin[1], of Berne, working in Siegrist's clinic, submitted one hundred consecutive cases of phlyctenular disease to von Pirquet's and Moro's tests, with the results that the von Pirquet reaction was positive in 90 per cent., and the Moro reaction in 85 per cent. I have not had the opportunity of consulting the original article, but the reviewer goes on to say that of the remainder 8 were carefully examined, and in all there was a strong family history of tuberculosis, or the patient showed obvious signs of tuberculosis. This leaves two cases, the subjects of phlyctenular disease, in which von Pirquet's test and also Moro's were negative, and in which there was no history or evidence of tuberculosis. I call attention to this as a weak point in what would otherwise have been a very strong link in the chain of evidence.

Davis and Vaughan[9], two American authors, found in 1912, that

as the result of the examination of 40 cases of phlyctenular conjunctivitis, 70 per cent. gave a positive von Pirquet reaction and 30 per cent. a negative. I again call attention to this 30 per cent. of negative results, especially as this test is of far greater value negatively than positively. The authors believe that tuberculosis is the underlying cause in all cases, and that the phlycten occurs only in those who are the subjects of tuberculosis, latent or otherwise, or are "candidates for tuberculosis."

These references are a few amongst the many which have been brought forward in the past few years, but are sufficient to show that in the large majority of cases the tubercle bacillus is present in some form in the individual who suffers from the disease; or, to put it in another way, "the phlycten is an almost sure finger-post to the presence of that micro-organism."

I say "almost sure" because there does exist good evidence that in a small minority of the cases the proof of the presence of the tubercle bacillus is wanting. The failure to react to tuberculin tests in a certain percentage is a fact which cannot lightly be disregarded.

How, then, are we to explain the aetiology of the phlycten?

All are agreed as to the importance which a careful and suitable diet plays in the treatment of the condition, pointing to the association of gastro-intestinal disturbance as being a more or less constant factor present, and it is interesting to remember that in a great number of cases indican is found in excess in the urine. (Colobomo[5], of Parma, found that 82 per cent. of cases of phlyctenular disease showed an increase in indican.)

Czerny[8] in 1909 published a thoughtful article, in which he spoke of the "exudative diathesis," a condition found in infants in the first twelve months of life, and caused, he thinks, by an abnormality in the power of the fat metabolism. In the first six months the condition expresses itself in the presence of milk-scab, thrush, scurf, geographical tongue, and sometimes catarrh of the nose, pharynx, and bronchi. Later, eczema appears, and the child is an easy prey to infections, amongst which, of course, tuberculosis holds its place, though it must be remembered that tuberculosis is rare in the first year of life.

This diathesis is not more common or more strikingly apparent in tuberculous families than in others, but is frequently found in nervous families. He considers that overfeeding with milk and eggs, and also carbohydrates, brings out the symptoms, but that flesh food has no bad effect on these children. He finds that phlyctenulae are common, and a sign of this diathesis, and that with suitable feeding the symptoms disappear. He regards the status lymphaticus as representing the condition in its most severe form.

Again,[13] Lafon, of Périgueux, in 1910, gives an even more interesting contribution on the subject, which, did time permit, I should like to quote in full. Briefly, he recognizes a complex and a simple group of cases of phlyctenular mischief, and the latter he arranges in three categories:

1. Patients who are already tuberculous when the eye trouble begins. The cause of the ocular disturbance in this class must be the toxin of the tubercle bacillus.

2. Patients free from a family or personal history of tubercle, in whom the eye mischief comes on after an infective malady, such as measles, scarlatina, whooping-cough, varicella, blennorrhagia, etc.

3. Patients free from tubercle and who appear to enjoy robust health when the ophthalmia makes its appearance.

It is this third class that Lafon has studied with particular attention and in support of the existence of such a class Victor Morax, of Paris, may be quoted, for he says: "Phlyctenular disease may be observed equally in children whose health is in the rudest possible condition, among whom all local tuberculous infection may be surely eliminated, and to whom we are not at liberty to apply the word scrofulous."

Lafon finds that these children, although said to be well by their parents, suffer from gastro-intestinal disturbances as the result of injudicious feeding; that they are the subjects of a chronic auto-intoxication of gastro-intestinal origin; and that the organism, in trying to rid itself of the toxins in various ways, provokes the formation of ocular phlyctenules.

The position as conceived by Lafon may be summed up as follows: If phlyctenular ophthalmia may in certain cases be attributed to toxins derived from a virulent bacillary focus, in other cases the lesions may depend upon digestive disturbances. At the same time that it provokes the formation of phlyctenulae, gastro-intestinal auto-intoxication diminishes the resistance of the organism against other infections. It creates a soil favourable to the evolution of all micro-organisms, notably of the tubercle bacillus. The conclusion is that phlyctenular ophthalmia may be due to different causes, amongst which gastro-intestinal auto-intoxication occupies the preponderating place.

Such is a brief consideration of the endogenous causes of the disease, but the possibility of an exogenous factor as an exciting cause is not beyond reason.

It has been well established that staphylococci are found in abundance in many cases of phlyctenular conjunctivitis, but their presence has not been detected in the efflorescences themselves. As to what part, if any, they play is a matter open to much question and remains undecided.

Straub[20] considered that an exogenous cause was more than likely

for several reasons, namely, the superficiality of the eruptions, their situation at the limbus, which shows alterations in almost every case of conjunctivitis, and from which he concluded that it is an excellent point of attack for exogenous infection, and, lastly, the often rapid success of external treatment. From the fact that staphylococci are so often found, he thought that they play an important rôle.

One might add that it is curious that the single phlycten so frequently appears on the conjunctiva in the palpebral fissure, thus suggesting an external irritation.

Axenfeld considers that the phlycten is the specific reaction of the scrofulous individual to all kinds of infection and that there is no need to accept only one cause for it.

One author, Gradle,[10] of Chicago, has treated the condition with staphylococcus vaccine. Nine cases in which recurrences had taken place, and which had failed to improve under ordinary treatment, were submitted to the measure, but the results were not too conclusive.

In 1912, Rubert,[15] of Kiefi, recorded the results of a series of experiments in tuberculous animals. Instillations of staphylococcus vaccine, staphylococcus toxins, and tuberculin were made in the conjunctival sacs, and it was then found possible to produce experimentally lesions which clinically and histologically resembled the phlycten of the human conjunctiva.

Pooley, of Sheffield, has tried instillations of tuberculin in the conjunctival sac as a form of treatment. In one case, he informs me, tuberculous iritis occurred, whilst another case was very suspicious. His results have not been published, but he has kindly permitted me to mention them.

It is well to remember the fact that phlyctenulae may appear in the course of a conjunctivitis due to the pneumococcus, Weeks's bacillus or the diplobacillus of Morax, and that the efflorescences themselves are the same histologically as those found in eczematous conjunctivitis.

Although in the last four or five years no further research appears to have been made in this direction, there is some evidence pointing to the existence of an exciting cause (which may provoke an attack in a suitable *terrain*) as being highly probable.

My own views, if I may be permitted to express them, are much in accordance with those of Lafon, that, with the evidence we have at present, the phlycten is the ocular manifestation of a toxaemia, which in many cases is undoubtedly tuberculous, but in a number, probably mild ones only, is of gastro-intestinal origin, the exact nature of which is unknown.

The phlycten in the majority of cases is undoubtedly a finger-post to the presence of the tubercle bacillus, but the fact that a number

of mild cases of the disease occur which clear up by treatment with local antiseptics, such as a little yellow oxide of mercury ointment, and a few doses of grey powder, combined with advice as to diet, especially this last-named, is one which is hard to reconcile with any set statement that a tuberculous toxaemia is the cause in all cases.

I think that we should recognize the existence of an hereditary diathesis, call it the exudative or what you will, but a condition which forms a bed-rock upon which infection readily takes place. Faulty hygiene, bad and improper food chiefly, opens the road still further to infection by micro-organisms. The tubercle bacillus, which is so wide-spread, is the one most successful, and perhaps the one most suitable, to such a soil, which then becomes scrofulous, but other infections may occur, any of which by their toxins may give rise to the phlycten.

As to an exciting cause, I think it is more than probable that such exists in every case, but whether it is mechanical, chemical, bacterial or not, it is impossible to say. Perhaps an unknown organism may be found.

The differential diagnosis of the disease should present but little difficulty.

Differential Diagnosis

An important point to bear in mind is the superficial nature of the lesion.

The age of the patient and the association in the majority of cases with the various signs of scrofulosis form valuable clues. When the conjunctiva alone is attacked, the condition may be confounded with other forms of conjunctivitis, but the localization of the red patch with the greyish-white phlycten, together with the absence of secretion, differentiates it at once.

Sometimes, as stated previously, phlyctenulae appear in the course of an acute conjunctivitis due to the pneumococcus, the Weeks's bacillus, or the diplobacillus of Morax, and I recall some five or six years ago an epidemic of such cases at the Wolverhampton Eye Infirmary; but smears of the secretion were taken, and showed either the pneumococcus or the Weeks's bacillus, and these findings, together with the subsequent progress of the cases, made it quite clear as to what was the condition.

Occasionally, an episcleritis may be confounded with a single phlyctenule in its later stages, but a few drops of adrenalin solution, as a rule, place the matter beyond doubt.

That interesting disease, spring catarrh, in its milder forms, presents an appearance not unlike that of an eczematous conjunctivitis in its later stages, but the smoky-yellowish, or sometimes brown, appearance of the conjunctiva in spring catarrh, together with the history, as a rule, form a sufficient differentiation.

In the bulbar form the nodules at the limbus simulate phlyctenulae, but the latter ulcerate rapidly and become resorbed, whilst the former never break down, and, finally, in both forms a smear to reveal the presence or absence of eosinophils is all but infallible in the diagnosis.

In the cornea, if we again remember the superficial nature of the lesion in eczematous keratitis, there will be little difficulty in coming to a conclusion, but there are a few conditions which may be mistaken for each other.

Trachomatous pannus is generally limited by a more or less horizontal line to the upper part of the cornea, and associated with it is cicatrization of the palpebral conjunctiva, especially in the superior fornix.

Eczematous pannus occurs on the cornea in any position and is often associated with an ulcer.

It is well to remember, however, that a scrofulous patient may be infected with trachoma, and the condition consequently then presents great difficulties in diagnosis.

A somewhat rare and interesting condition, namely, rosacea of the cornea, requires mention, for it may be confused with a troublesome case of eczematous keratitis, and not without reason, for in many ways the two diseases resemble one another in a striking manner. It occurs usually in women in middle life and is associated with rosacea of the face. The appearance on the cornea is that of a superficial keratitis with nodules of opacity which break down and ulcerate. Recurrence is frequent and the patient suffers from chronic indigestion. The age of the patient, the association of rosacea on the face and the chronicity of the complaint are guides to the differentiation from eczematous keratitis. Attention has been drawn to this disease by Cross,[6] Stephenson,[18] and Cruise,[7] the two first-named of whom specially note the resemblance to the phlyctenule of the cornea, and there is no doubt that the two diseases have much in common.

Treatment

In the treatment of this disease, with which I shall not detain you long, we must remember that practically all our patients are of the poor class. I can only recall about five or six private patients in 14 years. Captain P. H. Adams tells me he only remembers one in 12 years, and something like this is the experience of all ophthalmic surgeons. That being so, such measures as a trip to the Riviera or a sea-voyage are quite out of the question; and we have to consider treatment which it is within the capability of the patient to carry out.

Considering the local treatment first, we find that calomel

powdered on the eye in the case of limbal or conjunctival efflorescences is most useful, and that in all other forms Pagenstecher's ointment, i.e., the yellow oxide of mercury ointment, is the best, and should be combined with light massage.

It is noteworthy that a mercurial compound is the most successful.

If secretion is present suggesting an infection by micro-organisms, an antiseptic lotion is necessary, together with drops of silver nitrate, argyrol, protargol, or one of the many well known silver compounds.

Atropin is seldom necessary, except in the case of deep ulcers, and when hypopyon has occurred.

Some advise eserin in the severe cases, notably Kaz, of Petrograd, who states that it acts in a miraculous manner and he gives the usual explanation.

A number of drugs have been brought forward by various authors from time to time, but none seems to take the place of the two mercurial compounds which are so much in use, and there is no good purpose in enumerating them.

A word in praise of subconjunctival injections is necessary, however, and there is no doubt that in many cases they are beneficial. Ordinary saline solution or cyanide of mercury solution (1 in 5,000), combined with acoin solution to relieve the pain, would seem to be as effective as anything, although a number of other solutions has been extolled. My own experience is that some cases respond to this measure as though it were a charm, but that in others no effect is produced. I have never been able to decide as to what class of case is likely to be benefited, but they are well worth trying in all obstinate cases.

Side by side with subconjunctival injections must be mentioned dionin in drops of 2 or 3 per cent. solution, which acts in the same way, though much less actively. Especially are these remedies stated to be useful in helping to clear up opacities.

The general treatment is as important as, perhaps more important than, the local. Mostly it is directed against the scrofulous diathesis, and it is unnecessary to go further than to say that "light, air, movement and nutrition are the fundamental supports of both the prophylaxis and treatment."

The value of treating these sufferers as in-patients of a hospital is recognized by all surgeons who have to deal with them in anything like a large number, but too often after discharge do they relapse, are taken in again and again relapse. It would seem to be well worth while to have separate wards set apart in the hospitals where phlyctenular disease is very frequent, and this has been in my mind for some time with regard to Wolverhampton.

Regarding medicinal treatment, it is again striking that grey

powder, or small doses of calomel, should prove so beneficial, and its success in improving the general condition of these children bears out the opinion that gastro-intestinal auto-intoxication holds an important place in the aetiology. The exhibition of these drugs seems to be especially satisfactory in the fat, apparently over-nourished, cases that we meet with. The ill-nourished demand the usual building up with cod-liver oil, combined with the phosphate or iodide of iron; but even in these the mercurial drugs are very valuable.

The diet is summed up in little starchy food, and more meat, vegetables, and fruit.

These old-fashioned measures, about which, did time permit, more might be said, are not to be lightly put aside in favour of the more modern inoculation forms of treatment.

Reference has already been made to the injection of staphylococcus vaccine and its somewhat dubious success.

As to injections of tuberculin, it is now well established that they are of great value, but it may be presumed that no surgeon undertakes them before the simpler old-fashioned remedies have been tried. They should be, I think, and probably are by most, reserved for the more advanced and troublesome cases, which will not yield to simpler measures, and it would be wise to bear in mind the fact that in a number of cases evidence of the tuberculous focus is wanting though it probably exists, and that being so, the amount of vaccine administered should be a small one. Even in those cases where there is trustworthy evidence that the tubercle bacillus is present, the site and the extent of the trouble it has caused may be unknown, and the injection of tuberculin becomes a "shot in the dark." It is wise to begin with the smallest doses and to work up gradually.

As to surgical treatment, the procedure adopted by Hicks,[11] of New Brighton, N.Y., who excises a large phlycten, would seem to most of us, I think, to be unnecessary.

One small point as an adjunct in the management of these cases which I would like to mention, is the value of the correction of errors of refraction when present, and, in my experience, they are not uncommon. It has been my impression for some time that they existed to an unusual extent, and to satisfy myself on this point I took a few cases in succession and examined the refraction, with the result that about one-half showed an error, nearly always hypermetropia and hypermetropic astigmatism, and that in the majority of those the eye which showed the greater refraction error was the one which had been most affected. Needless to say, the error was obviously a previously existing one, and was not of the nature which might be put down to scarring of the cornea as the results of ulceration, *i.e.*, an irregular astigmatism.

In conclusion, I think that a great deal remains to be done in the direction of the preventive treatment of this disease.

Quite apart from the close association of tuberculosis, the chief aetiological factor which is usually assigned to it is summed up in the words "bad housing," and there the matter seems to end without any, or at least without sufficient, consideration as to what the phrase means.

Do not Dr. Priestley's figures, as well as my own, tend to show that "bad housing," as evidenced by overcrowding, personal uncleanliness, and ragged clothing, has but little effect, whilst malnutrition is undoubtedly a factor?

Speaking in a general way with regard to children, Dr. Priestley regards malnutrition as evidence of disease and not necessarily as evidence of insufficient or bad food.

Applying this to the evolution of eczematous kerato-conjunctivitis, we have to decide whether malnutrition is cause or effect; but whichever it is there is one constant factor present in the disease for which there are many proofs, namely, gastro-intestinal disturbance, and does not this point to food, contaminated and improper, as being in some way the beginning of the whole trouble?

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PHLYCTENULAR DISEASE AND ITS RELATION TO TUBERCULOSIS

BY

R. BEATSON HIRD, M.D., F.R.C.S.Ed., CAPT. R.A.M.C. (T.)

HON. OPHTHALMIC SURGEON TO THE GENERAL HOSPITAL, BIRMINGHAM; HON. ASSISTANT SURGEON TO THE BIRMINGHAM EYE HOSPITAL.

THE substance of my present remarks on the relationship of tuberculosis to phlyctenular disease formed the subject of a short paper read before the Midland Medical Society in April, 1914. I have purposely delayed its publication in order that the cases might be kept under observation for some time to see if the results were satisfactory. The number of cases dealt with is not large, but I have had scores since then and have had no reason to change my opinion of four years ago. Much has been written on this subject during the last few years, and I offer this contribution to confirm and strengthen the growing opinion that there is a relationship between phlyctenular disease and tuberculosis. If this is correct, then phlyctenular disease assumes an importance beyond that of a superficial local inflammation. It is undoubtedly the commonest cause of corneal opacities in children. During the last four years as ophthalmic surgeon to the City of Birmingham Education Committee, I have had 4,702 new cases of children suffering from ocular defects referred to me, and amongst these, 308, or over six per cent., had corneal scars in one or both eyes. Many in consequence have had to be educated at one of the special schools for the partially-blind and blind. The children in these schools are frequently leaving or being transferred to other schools, but the following was the result of an examination of all the scholars attending one of the schools for the partially-blind inspected by me a little while ago. I found no less than 64 per cent. suffering from corneal opacities which had rendered their education there a necessity. The commonest cause was phlyctenular keratitis which accounted for 50 per cent. for certain. There were some doubtful cases which might well have come into this group, but I excluded

them as the history was uncertain. This damage done to vision is a very serious matter, often the sight being so crippled that the child will never be able to be a useful citizen. In its active state the disease prevents the child from attending school often for months, so that the child falls behind in education even if the sight is not affected sufficiently to render it necessary to give up ordinary school. The ravages of this disease amongst the children of the poorer classes is a tragic chapter in their little lives, and taxes the patience of both parents and doctor. Its importance, then, needs no further emphasis. It is absolutely essential that these children should receive sympathetic care and early efficient treatment before the disease has become firmly established and before permanent damage is done to the sight. Any treatment that will hasten the cure and above all prevent recurrences should be tried and persevered with. I am firmly convinced, from my own experience of the past few years, that in tuberculin we have a very important remedy. In this I am in full agreement with many other workers in the same field.

The remarks which I have to make relate to fifty-seven consecutive cases of phlyctenular disease attending my department at the General Hospital, Birmingham. There was therefore no selection of cases whatever. The time covered was a period of about fifteen months. The series of cases would have been extended considerably but for the present war. My own military service and that of my colleagues made such a call on our time that thorough investigation, such as I wished to continue, had to be given up.

I have purposely left untouched the large number of cases under my care at the Birmingham Eye Hospital, because I had not the ready facilities there for the necessary investigations. All my cases were examined from the point of view of tuberculosis as a causal agent, at the same time bearing in mind other factors held responsible for this disease.

For the diagnosis of the presence of tuberculosis, I made use of the following:

(1) The general appearance of the patient. The majority presented the typical appearance which has been designated strumous, especially the torpid variety.

(2) Family history of tuberculosis.

(3) The presence of definite tuberculous lesions elsewhere in the body, including those disclosed by X-ray examinations of the chest.

(4) Tuberculin tests. I used the cutaneous test of von Pirquet, and also subcutaneous injections of tuberculin.

The analysis of my 57 cases presented the following results:—

(1) *Types of disease.*—(*a*) Conjunctivitis. In 34 of the cases the conjunctiva was affected, giving a percentage of 59·6. This included all varieties of the disease, from fine multiple sand-like

deposits at the limbus to the large florid nodules. Of this latter type there were six cases, and in four of them active tuberculosis elsewhere in the body was demonstrated, and in one other case the mother of the child was consumptive. It would be interesting to know if this variation has anything to do with the strain of tuberculosis, bovine or human. I was unable to come to any definite conclusion.

(*b*) Keratitis. The cornea was affected in 41 of the cases, giving a percentage of 71·9. This group included fine superficial lesions with loss of surface, as well as definite ulcers, in a few cases large and deep. There were 13 cases of pronounced ulceration. These ulcers were persistent and reluctant to heal. In one case of a deep central ulcer, no progress took place for weeks under ordinary local treatment, but was soon cured with tuberculin injections.

In 17 of the cases the conjunctiva and cornea were affected at the same time.

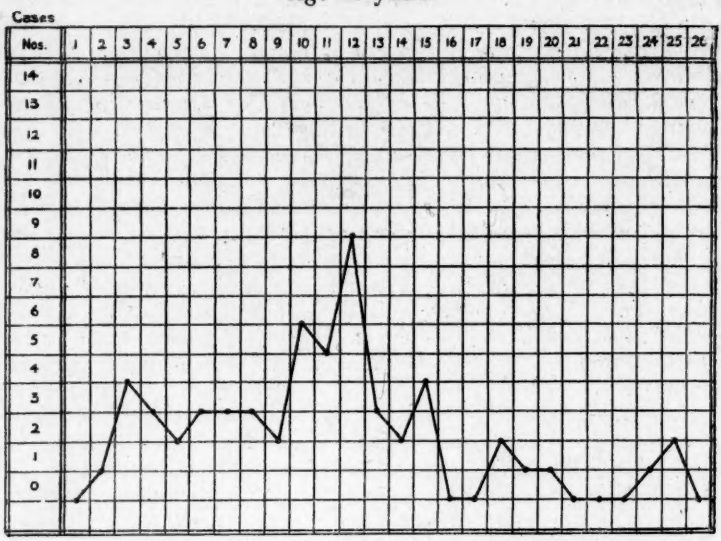
(*c*) Blepharitis. In 6 of the cases there was a chronic form of blepharitis, with in some instances considerable general thickening of the lid. This is a special type of blepharitis which resists ordinary local treatment, but which can be cured by tuberculin injections. The percentage of these cases was 10·5. I have recently had a marked example of this blepharitis under my care, which cleared up in a few weeks under tuberculin without any local applications.

(2) *Sex.*—The cases were very evenly divided between the two sexes, as there were 26 males and 31 females.

(3) *Age.*—The age incidence is shown in the accompanying chart. It is interesting to note that 87·7 per cent. of the cases occurred during the age period from 1 to 15, and that no cases were met with after the age of 25. Indeed, with very few exceptions, phlyctenular disease is an affection essentially of childhood. Several explanations have been forthcoming. Harman has blamed the decay of the teeth. A possible explanation seems to me to be the infection in early childhood from milk, with an evident increase either in immunity or resistance as the child grows up. If the condition is tuberculous, the milk is one of the most likely origins of infection and may account for the relative frequency amongst the poorer classes. I have had a few undoubted cases amongst apparently healthy country dwellers; in every case there was a tuberculin reaction, and the milk was the only possible source of infection. I wish I could have known the condition of the cows from which the milk was obtained. If the milk is the chief source of infection, then the bovine strain should be the usual cause, and this must be remembered when treating with the tuberculin. If human tuberculin is used without success the bovine variety should certainly be given a trial.

(4) *The Eyes affected.*—In 33 cases both eyes were affected. In 11 the right eye only, and in 10 the left only. In three instances the side affected was not recorded.

CHART SHOWING AGE INCIDENCE IN 57 CASES OF PHLYCTENULAR DISEASE.



(5) *The Teeth.*—The teeth were carefully examined in 32 of the cases. No decay whatever was present in 17, or over 50 per cent. It is a fact that the teeth tend to decay in the strumous children rather readily, and I, personally, do not attach any importance to the teeth as a causal agent in this disease. My figures, I think, substantiate this. One obstinate case with frequent recurrences sought advice elsewhere and the cause was attributed to one decayed tooth, but expert dental treatment failed to prevent further recurrences and I have the patient now undergoing a course of tuberculin. A positive reaction was obtained in this patient with focal reactions in the affected eye after tuberculin injection.

(6) *Cervical Adenitis.*—Enlargement of the cervical glands was recorded in 36 cases, or 63·1 per cent. Some of these may have been due to infection through the teeth. I am of opinion that a large number were undoubtedly tuberculous. In three cases the

glands softened and went on to abscess formation, requiring surgical interference.

(7) *Evidence of tuberculosis elsewhere in the body.*—In 30 of my cases, or 52·6 per cent. of the total, a careful search was made for tuberculosis elsewhere in the body, and I am much indebted to my medical and surgical colleagues at the General Hospital for their assistance. In these 30 cases tuberculous lesions were found in 23, or 76·6 per cent., of the cases examined specially, and 40·3 per cent. of the total of my series. The cases particularly chosen for the examination were those which I wished to treat with tuberculin on account of their chronicity, severity, or reluctance to get well under ordinary treatment, and were especially the corneal ones. The sites of the tuberculous lesions were as follows:

(*a*) *Cervical glands.*—I mention here the three cases which went on to abscess formation requiring surgical aid. There were several also which did not go on to abscess formation, but in which the glands were excised and pronounced tuberculous.

(*b*) Lesions in the lungs were found in 12 cases, and in one other case there were some signs, but not very definite. These cases included old healed apical disease, enlarged bronchial glands shown by X-ray photograph, and in one there was definite active tuberculosis at the apex.

(*c*) Lupus of the face was present in three cases. There was also one case of scrofuloderma of the neck.

(*d*) Joint disease was present in four cases and pronounced by the surgeon in charge as tuberculous. The joints affected were shoulder 1, wrist 1, hip 1, and knee 1.

(*e*) Bone disease. There was 1 instance of tuberculous tarsitis. In 7 of the cases especially examined for tuberculosis we were unable to find any signs of that disease elsewhere.

(8) *Tuberculin tests* were performed in 16 cases where the diagnosis was in doubt. In 15, or 94·1 per cent., the result was positive. One case which did not give a positive reaction was pronounced by the physician examining the case as showing undoubted physical signs in the lungs. In this case the test was von Pirquet's cutaneous test. In 6 other cases in which this test was done the result was positive. The great majority of cases of phlyctenular disease give a positive von Pirquet, as I have found at the Birmingham Eye Hospital, where I almost always have this test done. A few cases fail to give it, although they are clinically exactly similar to the other ones. In 9 of my cases the subcutaneous injection of tuberculin was employed, and in all a positive reaction was obtained.

(9) *Tuberculin treatment.*—I was not permitted to carry this out in every case I wished, but a course of tuberculin was given in 14 cases with excellent results in 12, or 85·7 per cent. It

is interesting as well as gratifying to record that in 2 cases only has there been a recurrence to my knowledge, and in both cases I gave a further course of tuberculin and they have since remained well. From two to three years have now elapsed since these cases were treated. Tuberculin was not the sole treatment given in any case. The usual local remedies, such as yellow oxide of mercury ointment, atropin, dionin, etc., were used, and in a number of cases cod liver oil in some form was supplied. The children were also encouraged to get out in the fresh air as much as possible. There are a few cases I should like to refer to in particular.

One case (26) was a boy, aged 12, who had a consumptive mother. He had been troubled with his eyes for months, and had not attended school for a very long period. He had the florid type of phlyctenular conjunctivitis, and was always getting recurrences. He had swollen cervical glands and gave a positive tuberculin test. I tried this boy on all the ordinary remedies for some weeks without any good result. He soon mended under tuberculin injections, but left off attending before his course was completed. He came back to me sometime later with a recurrence and had further tuberculin, attending regularly. Since then there has been no further recurrence.

Perhaps the most interesting were two sisters, Nellie (113), aged 12, and Lily (196), aged 5½. The elder sister attended hospital two months before the younger. Both her eyes were affected, the cornea and conjunctiva being attacked. She was typically strumous in appearance, had enlarged cervical glands, and definite evidence of lung tuberculosis. She gave a positive tuberculin reaction. For three months she was given all the usual treatment, but was never well enough to attend school. She suffered from intense photophobia and lacrymation, had the type of blepharitis referred to above, and developed a deep central ulcer which absolutely stood still under all the treatment tried. After two months she arrived one morning with her younger sister, Lily. This child was also typically strumous, and suffered from blepharitis and phlyctenular conjunctivitis and corneal ulcers. She had enlarged cervical glands and signs of lung tuberculosis. She was also put on ordinary recognized treatment. When she had been attending a month with no definite improvement, and her elder sister three months, I decided to give the elder sister tuberculin. The effect was really remarkable. The chronic ulcer began to heal straight away, and the whole condition to improve. She began to get colour in her pale cheeks, and was able to open her eyes properly. She left her little sister standing. After several weeks I started the younger sister on tuberculin also, as she had not moved at all in the meanwhile. Her lacrymation, blepharospasm, etc., also began to clear up. Both these children had been absent from school for several

months, but they soon got well enough to return. The elder girl's vision when she had completed treatment, was right eye 6/12 part and left eye 6/18. The cases of these two children would alone have convinced me of the value of tuberculin. I have had numbers since then equally convincing. I would just refer to another case supporting this statement:

A.M., a woman, aged 20. She had lived in the country all her life on her father's farm, and managed the dairy, including milking the cows. From the age of 14 she had suffered from inflammation of both eyes with only short intervals free from the trouble. It was a great distress to her and much interfered with her work. She had sought advice elsewhere, but had never had more than temporary relief. When I saw her she had scars on both corneæ and some fine loss of corneal epithelium in one eye. There was much photophobia and lacrymation. She was a healthy, stoutly built girl. A von Pirquet test was markedly positive and the results took over eight weeks to subside. Local treatment was tried for a few weeks with but moderate success, and I persuaded her to have a course of tuberculin. This course lasted five months. There was a local reaction after almost every injection and several focal reactions in the eye of a mild, but definite, nature. She made gradual and steady progress. After starting the tuberculin she was soon able to do her work, and there were no fresh corneal ulcers. When the course of treatment was finished her vision was right eye 6/6 and left eye 6/6 part with glasses correcting some astigmatism. It is now over a year since she finished her treatment with tuberculin, and with the exception of two days when she had slight irritation in one eye, 10 months ago, she has been absolutely free from any ocular trouble, a thing she had not known for several years. There is no object in detailing more cases. Those I have cited are typical. One thing that has impressed me is that the corneal opacities seem to clear up better when tuberculin is used. It is true that I gave all these patients local treatment, such as yellow oxide of mercury ointment, often combined with dionin, applied continuously for a month. I always have a number of these cases undergoing tuberculin treatment at hospital. Now and again I get a very obstinate case, and I am sure in some of these, at any rate, there is a syphilitic taint as well, for the Wassermann test is positive as well as the tuberculin test. In such cases both stigmata will require appropriate therapeutic attention.

Just a few remarks on the use of tuberculin. von Pirquet's cutaneous test will be found to give rise to reactions of varying intensity and, I think, may be used as an index to the sensitiveness of the patient to tuberculin and guide one as to the strength of the initial dose to be selected in starting the treatment. It must be a matter of common observation that there is often a favourable turn in the local disease after this cutaneous test. It is, of course,

only transient and due to absorption of some of the tuberculin at the site of the test, and may be taken as an encouraging sign for further tuberculin treatment. I make use of both T.R. and B.E. preparations, generally prepared from the human strain, but in some cases the bovine. The T.R. being the weaker preparation it is better to begin with it in cases believed to be rather sensitive. It may afterwards, if necessary, be followed up with a course of B.E. When using T.R. my initial dose is never more than 1/10,000 mg. If there is no focal reaction I gradually increase the dose every four days until 1/1,000 mg. has been given, when I give the injections once a week, increasing up to 1/100 mg. After that I give this dose, or 1/50 mg., repeated a few times once a fortnight. When using B.E. I start with 1/100,000 mg., or sometimes even less, and give it in increasing doses on a similar scale to the T.R. Each case, however, must be treated on its own merits, and no procedure can be laid down applicable to every case. Opinions, I know, differ as to the variety of tuberculin to be used and its dosage. *Chacun à son goût.* The method I have used has given me every satisfaction.

For over the past ten years now, evidence has been steadily accumulating in favour of the relationship of tuberculosis to so-called phlyctenular disease, and yet it is not universally accepted, or, if it is, then this disease does not always receive the attention it should. Hundreds of cases are treated in a more or less perfunctory manner, and having seen the results of the ravages of this disease amongst thousands of children attending the schools in a large city, one hopes that the time has arrived when everything possible will be done to stop it. As far back as 1906 Nias and Paton[1] examined the opsonic index for tubercle in a number of cases of phlyctenular disease. They found the blood behaved in a manner quite typical of a definite tuberculous infection, and concluded that the disease was due to attenuated or dead bacilli escaping from some focus, identified or not. Since then there have been numerous publications on the subject. I would particularly call attention to the discussion on this subject at the annual meeting of the British Medical Association in 1912[2], so ably opened by George Mackay. His paper, and those that followed, determined me to settle the question so far as my cases were concerned. Contributions on this subject have been made by Stephenson[3], Weekers[4], Davis and Vaughan[5], to mention only a few. They have all supported the tuberculous cause of this disease. Parsons[6] holds that the disease is not an eczema; that staphylococci found may be accessory though not causal, but more likely are mere contaminations. He mentions the possibility that the disease is due to tubercle toxins. Tubercle bacilli have never been demonstrated in the tissues affected and inoculation experiments have proved negative. The disease then must be due either to toxins or bacillary remains or fragments conveyed either

viâ the blood or lymph. As the cornea is normally avascular the lymph spaces would appear to be the only road of infection for that tissue. The disease, however, appears primarily to affect what is morphologically the conjunctival portion of the cornea, extending deeper beneath Bowman's membrane later. Iwanoff has shown it to be an infiltration round the nerves, and this may account for the pain and photophobia. This photophobia and reflex spasm of the lids are characteristic signs of this disease and have always seemed to me to have a direct connection with involvement of the fifth nerve terminations. Is it possible that in these cases the fifth nerve is hypersensitive to tubercle toxin, if not actually acted upon by it? In such a case the disease may have some pathological relationship to herpes.

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THE USE OF TUBERCULIN IN EYE DISEASES

BY

FR. VERHEYDEN, M.D. Louvain.

LATE CHIEF ASSISTANT TO THE EYE DEPARTMENT, POLYCLINIC, BRUSSELS; TEMPORARY ASSISTANT SURGEON TO THE EYE, EAR, AND THROAT HOSPITAL, SHREWSBURY.

MY object is to lay before my readers, and to sum up briefly, the results of nearly three years' experiments, partly by Drs. C. G. Russ Wood and F. A. Anderson, and partly by myself, of the continued and systematic use of tuberculin in a number of eye diseases.

Cases of "strumous" affections, such as keratitis strumosa, kerato-conjunctivitis, miliary keratitis, tuberculous iritis, irido-cyclitis, episcleritis, scleritis, central tuberculous choroiditis, and tuberculous paralysis of the third nerve, were at different times submitted to the treatment.

Keratitis strumosa in its various manifestations

All used to hospital ophthalmic work, know how disappointing may be the treatment of the above-named disease. These forms of localized tuberculosis common in children are an ideal field for tuberculin treatment in small doses. The treatment is best given in hospital, because definite and precise precautions should be taken to spare the patients avoidable inconveniences. This disease, so

various in its manifestations and met with where conditions of life are defective, with poor food, and in large families, frequently recurs, after everything has been tried to improve the patient's condition. As a final result of prolonged treatment, we see large and numerous nebulae of the cornea, which impair the sight, and may cause the development of myopia in children. It is most satisfactory to notice how quickly under the influence of tuberculin injections this troublesome disease subsides. The photophobia, blepharospasm, and hyperaemia, with concomitant lacrymation, are in a few days much relieved, in certain cases disappearing altogether. Success is not the reward in every case; we see patients coming back with recurrence, but repeated injection intensifies the benefit of the first. The final results are good and the treatment is much shortened. The cure is associated with the use of atropin ointment in the diseased eye each time there is any indication. The preparation of the injections, their dosage, and some other features of the method will be dealt with at the end of this article. The treatment in cases of keratitis strumosa clears up the aetiology by the reaction the patient shows locally and generally. Experience shows how the dose may be gradually increased at intervals, so that a practical immunization with all its benefits occurs. Cases demonstrating these observations are not given, only more important histories in the more obscure diseases being related.

Scleritis and Episcleritis

Obscure as is their origin, we may to-day safely state that many cases of scleritis and episcleritis are tuberculous, and can be dealt with, if only slowly, in a satisfactory manner by the use of tuberculin. Before coming to the conclusion of a tuberculous aetiology, we must in every case carefully exclude gout, rheumatism, malaria, menstrual disorders, syphilis, or late gonococcal infection. Early treatment may perhaps in cases of deep scleritis prevent the iris and the choroid being involved; suppose we only spare the patient this complication it is invaluable.

Case of J. D., 27 years.—*August* 16, 1916.—R.V.=6/6, L.V. =6/18. Typical nodular episcleritis.

August 25.—Injection T.O. 0.0001 c.c.

August 26.—Temp.=102.4°. Local and focal reaction.

September 1.—Injection T.O. 0.0001 c.c.

September 2.—Temp.=99°.

September 3.—Temp.=101°. Intense local and focal reaction. During the following days the eye progressively improved.

September 3.—Subconjunctival injection of Wright's saline solution in the diseased eye. Atropin was freely used locally, three times a day, combined with the general treatment.

October 18.—When seen for the last time this man felt very

comfortable, all acute symptoms were gone, and the eye was perfectly quiet.

Iritis and Irido-cyclitis

The use of tuberculin throws a very strong light on the prognosis and the treatment of tuberculous diseases of the uveal tract, especially of the iris and the ciliary processes. In tuberculous iritis or irido-cyclitis, interstitial trouble of the cornea, associated with "keratitis punctata" often overshadows the primary lesions which are the substratum of the disease.

Case of Private A., aged 25 years. *July* 23, 1916. R.V.= 6/6, L.V.=Hand movement. Intense photophobia, infiltration of the cornea, "keratitis punctata," intense pericorneal injection, pupil small.

July 24.—Injection T.O. 0.0001 c.c.

July 25.—No reaction, either local or focal, no rise in temperature.

July 27.—Injection T.O. 0.0001 c.c.

July 28.—Local but no focal reaction. Temperature 100°.

August 2.—Injection T.O. 0.001 c.c.

August 3.—Local and focal reaction. Temperature 102°. We thought the rise in temperature too high, and returned to smaller doses.

August 18.—Injection T.O. 0.0001 c.c.

August 19.—Temperature 98°.6. Neither local nor focal reaction.

September 12.—Subconjunctival injection of Wright's saline solution.

September 16.—R.V.=6/6, L.V.=6/18. T.O. 0.0005 c.c. No reaction.

September 22.—Injection T.O. 0·001 c.c. No reaction.

Atropin was used three times a day during treatment. Each time focal reaction was present, the condition of the cornea improved quickly on the following day, the infiltration and "keratitis punctata" progressively giving way; and at the same time the pupil dilating better.

Private A. left hospital at the end of September, and is now with the Army in France. Only small interstitial opacities were left, the pupil reacting well, and every trace of "keratitis punctata" having gone. In this case the tuberculous origin was confirmed by characteristic cicatricial patches of the skin of the right arm just below the elbow, looking like the cicatrices of lupus.

We believe that all cases of chronic irido-cyclitis, also when associated with choroido-retinitis, are fields for investigation with tuberculin treatment. In some cases the results were negative, in others positive; but, generally speaking, in these lesions, especially

when of old standing, and when the diagnosis has been confirmed late, the results were slower and less brilliant than in earlier infections, because profound disorganization in the layers of the retina and choroid has occurred.

Central tuberculous choroiditis

We only saw one case at an early stage.

Gwen C., 18 years. *August* 18, 1916. Came to the hospital because the sight had been failing in the right eye for a week. R.V. =fingers at 2 feet. L.V.=6/6. The cornea was slightly hazy, with "keratitis punctata," there was slight pericorneal injection, the pupil was rather dilated; the vitreous hazy, but allowed us to see the macular lesion as one indistinct white patch slightly raised above the level of the retina. The patient was first submitted to a ten days' course of guaiacol diaphoresis, thinking the lesions too acute to use tuberculin at once, and fearing a miliary generalization in the eye. We started injections of tuberculin on August 30 with the ordinary initial doses, T.O. 0.0001 c.c.

August 31.—No local reaction. Temp. 99.8°.

September 3.—R.V.=3/60 and L.V.=6/6.

September 14.—R.V.=6/60. L.V.=6/6. There was still a slight rise of temperature daily, which on September 14 was 100.1°, contra-indicating further injections for the time being.

September 15.—Temp. 99.4°.

September 17.—Temp. normal. Injection of T.O. 0.0001 c.c.

September 18.—No reaction either local or focal; no rise in temperature.

September 20.—Injection of T.O. 0.0001 c.c., followed by slight local reaction only. On September 23, the lesion of the fundus was a patch of choroiditis strictly limited to the macular region accounting for the defective vision.

Paralysis of the third nerve of tuberculous origin

The case we now refer to was first seen by Dr. C. G. Russ Wood on October 13, 1913. Partial ptosis was present in both eyes, no paralysis of internal recti or obliques; the right superior rectus was paralysed. The patient's principal complaint was recurrent drooping of the lids with intense headaches. This case was looked upon by Dr. C. G. Russ Wood and several colleagues as an instance of myasthenia gravis, in relation to the history given. At a meeting of the Midland Ophthalmological Society several members came to the same conclusion after examination of the patient; but a suggestion of possible tuberculous origin was made. Tuberculin treatment was suggested.

April 29.—Injection T.O. 0.0001 c.c.

May 1.—Local reaction. Temp.=99.2°. The next day the patient opened her eyes well.

May 5.—Slight diplopia, and slight limitation of movements of the globe upwards.

May 11.—Practically no ptosis. Injection T.O. 0.001 c.c.

May 14.—Severe malaise, pain in arm and in the eye.

May 21.—No ptosis, movements of the eye still limited upwards.

June 4.—Injection T.O. 0.001 c.c., followed by local and focal reaction.

June 20.—Ptosis recurred; diplopia more pronounced. Injection T.O. .001 c.c.

August 2.—Diplopia ceased a week after last injection.

January 7, 1915.—Recurring diplopia and ptosis. Came into the hospital to have a course of injections. Injection T.O. 0.002 c.c. Slight reaction.

January 15.—Injection T.O. 0.003 c.c. Very slight reaction.

January 18.—Injection T.O. 0.006 c.c. Slight reaction.

January 19.—Injection T.O. 0.009 c.c. No reaction.

The patient was seen for the last time on April 4, 1916, when she was fit and comfortable. The course of the disease in this patient points distinctly to the tuberculous origin of the trouble. There was somewhere in the course of the third nerve a tuberculous deposit responsible for the symptoms. No signs were available for exact localization.

I look on this, and the previous case, as showing the value of tuberculin: first, as confirming a doubtful diagnosis, and, secondly, as a precious adjuvant to the curative agents we may handle with success where everything else has failed.

Preparation of and ways to use tuberculin

After several trials, Dr. Anderson, whose method we adopted, decided to use old tuberculin, as prepared by Messrs. Burroughs, Wellcome & Co.

All aseptic precautions being taken, and everything used being sterile and clean, 1 c.c. of old tuberculin is diluted with 9 c.c. of a solution of normal saline to which has been added .50 per cent. of lysol. This gives 10 c.c. of solution T.O. .1.

1 c.c. of T.O. 0.1 is diluted with 9 c.c. of the same, and gives 10 c.cm. of T.O 0.01.

1 c.cm. of T.O. 0.01 is diluted with 9 c.c. of the same, and gives 10 c.c. of T.O. c.c. 0.001.

1 c.cm. of T.O. 0.001 is diluted with 9 c.c. of the same, and gives 10 c.c. of T.O. 0.0001.

Usually we do not dilute more, using 0·5 c.c. of solution T.O. 0.001 in cases where special care is to be taken; this brings the

initial dose to T.O. 0.00005. In exceptional cases treatment may be started by T.O. 0.00001.

Before submitting any patient to tuberculin injections, the urine should be tested. The slightest rise in temperature causes the treatment to be postponed until the temperature is normal.

Reactions after tuberculin injections

The patient submitted to the initial dose of, say, T.O. 0.0001, may behave in several ways; and safety requires that he should be kept in bed, the temperature being taken every four hours. There may be no reaction, either local or focal, and no rise in temperature.

The rise in temperature may be the sole sign of reaction.

There may be a slight local but no focal reaction, nor rise in temperature. Local and focal reaction may be present, together with a rise of temperature.

Focal reaction means the flooding of tuberculous areas with blood carrying antibodies; it is observed in visible lesions and is most important. A rise of temperature means the body defending itself against actual infection.

We should call an ideal reaction after tuberculin injection a rise to 100°F., slight headache and nausea being present. Locally, a red patch about one inch in diameter, slightly swollen above surrounding tissue, constitutes the typical reaction; in the eye slight pain may be present, with concomitant increased redness. When these mild symptoms occur, the initial strength of the first dose is not to be increased. T.O. 0.001 c.c. solution will only be used when no more reaction can be elicited by T.O. 0.0001 c.c.; and T.O. 0.01 c.c. when T.O. 0.001 leaves the patient without reaction at all. When after injection of T.O. 0.001 the temperature rises to 102°F. and the patient feels intense malaise, and there is intense local reaction, with pain and swelling; T.O. 0.0001 should be used as long as the reaction is so violent. The same procedure is to be applied in connection with the stronger solutions. Locally when reaction is too violent, antiphlogistine is to be applied, and the patient kept in bed on light diet.

When solution T.O. 0.0001 c.c. is too strong 0·5 c.cm of the same, or T.O. 0.00005 c.c. should be given as the initial dose. In a negative result, when T.O. 0.0001 c.c. shows no reaction at all, the strength is gradually increased until a reaction takes place. If the results are still the same, a negative conclusion will be justified.

Concomitant Treatment

Two days after the injection of tuberculin, dionin, 4 per cent. solution, should be used, one drop three times in succession at one minute intervals, in the diseased eye daily. Dionin constitutes

a powerful stimulant, a lymphagogue, and increases the phagocytic action.

Subconjunctival injections of Wright's saline solution, used from time to time during the treatment, are most useful.

Conclusion

After careful and controlled observations, we have come to the conclusion that tuberculin ought to be more frequently used in practice. Many eyes will be saved which formerly would have been lost, or the value of which would have been largely reduced.

Carefully tested and manipulated, risks of accidents with tuberculin are negligible; the results will be most gratifying, first in confirming a doubtful diagnosis, and, later, in ameliorating or altogether curing these serious and rebellious diseases.

I feel most grateful to Drs. C. G. Russ Wood and F. A. Anderson, who allowed me to collect their own cases, and to add those to the ones I treated myself during my stay at the Eye, Ear, and Throat Hospital at Shrewsbury as temporary assistant surgeon.

ANNOTATIONS

A National Ophthalmological Advisory Committee

Readers will recall the fact that upon more than one occasion we have urged the necessity of forming a National Ophthalmological Advisory Committee, to which all problems having an ophthalmological bearing arising in any Government Department, both during and after the war, should be referred. On the last occasion (January, 1918, p. 48) on which we referred to the subject, it was suggested that the Ophthalmological Society of the United Kingdom and the Section of Ophthalmology of the Royal Society of Medicine should combine forces, hold a meeting during the congress of the former Society in May, and "appoint a committee of ten or twelve members to act as a consultative body, and to watch over the public interests of ophthalmology and of ophthalmic surgeons." The suggestion has been taken up, and the letter printed below, signed by the past and present Presidents of the Society and the Section, calls a meeting for the purpose. It will be sent to the members of the Society and the Section, and we feel confident that the proposal which it embodies will be carried without a dissentient voice.

DEAR SIR,

From time to time, Government departments and other public bodies have had to deal with matters of ophthalmological interest

and importance, and, from the ophthalmologist's point of view, have usually done so in a very inadequate fashion.

For the establishment of the maximum degree of efficiency in the Army, Navy and Air Services, in the re-organisation of industry which is likely to take place after the War, and in connection with the proposed establishment of a Ministry of Health, numerous ophthalmological questions will arise.

It has been suggested that an authoritative and representative Council of British ophthalmologists should be formed to advise and assist Government departments and other public bodies as to suitable standards of vision for different occupations, as to measures for the preservation and welfare of the eyesight of the community, and in any other matters in which the knowledge and experience of ophthalmologists will be of special service.

To bring about the formation of such a Council it is proposed that a meeting shall be held at the Royal Society of Medicine, 1, Wimpole Street, W., on Thursday, May 2nd, at 6 p.m,, immediately after the Annual Meeting of the Ophthalmological Society. All British ophthalmologists are invited to attend.

The first resolution to be proposed at this meeting will be :—

"That a representative Council of British ophthalmologists be formed to supervise matters of ophthalmological interest arising in connection with public affairs."

If this resolution is carried, the constitution of the Council will then be considered. It is suggested that it should consist of three classes of members : (*a*) Permanent ; (*b*) Annually selected ; (*c*) Co-opted.

(*a*) The permanent members to be the present and past Presidents of the Ophthalmological Society of the United Kingdom and of the Section of Ophthalmology of the Royal Society of Medicine.

(*b*) The annually selected members to be nominated in equal numbers by the Councils of the Ophthalmological Society of the United Kingdom and the Section of Ophthalmology.

(*c*) The Council so formed to be granted power to co-opt other members for special purposes.

We are, Sir,

Yours faithfully,

ANDERSON CRITCHETT,	J. B. LAWFORD,
JOHN TWEEDY,	F. RICHARDSON CROSS,
PRIESTLEY SMITH,	WM. LANG,
GEORGE A. BERRY,	E. TREACHER COLLINS.

School Lighting

There seems to be some hope of the important subject of education receiving some measure of attention on a more scientific

plan than has been the case in the past. The question of the satisfactory lighting of schools is one of the greatest importance both from the point of view of the prevention of what is known as school myopia, and also for the removal of strain and hence loss of efficiency in normal sighted children. We have just received an advance copy of a new code of lighting school buildings issued in New York by the Illuminating Engineering Society. We are not aware of the existence of any similar published code in this country. Such a code would be of great assistance both in designing new buildings and in the improvement of the lighting conditions in old ones. In the hope that some useful discussion of the recommendations given by the American Society may follow we give the following summary :

" 1. Intensity of artificial illumination.

	Minimum foot candles per square foot
Storage spaces	0.25
Stairways, corridors	0.5
Gymnasiums	1.0
Rough shop work	1.25
Auditoriums, assembly rooms	1.5
Class rooms, study rooms, laboratories, blackboards	3.0
Fine shop work	3.5
Sewing, drafting rooms	5.0

" 2. Lamps should be suitably shaded to minimize glare. Glare, either from lamps or from unduly bright reflecting surfaces, produces eye-strain.

" 3. Lamps should be so arranged as to secure a good distribution of light on the work, avoiding objectionable shadows and sharp contrasts of intensities.

" 4. Walls should have a moderate reflection factor; the preferred colours are light gray, light buff, dark cream and light olive green. Ceilings and friezes should have a high reflection factor; the preferred colours are white and light cream. Walls, desk-tops, and other woodwork should have a dull finish.

" 5. Emergency lighting should be provided at main stairways and exits to ensure reliable operation when, through accident or other cause, the regular lighting is extinguished.

" 6. All parts of the lighting system should be properly maintained to prevent deterioration due to dirt accumulation, burned out lamps and other causes."

When daylight is used it is recommended that the minimum intensities should be considerably greater than those provided in artificial lighting, owing to the adaptation of the eye to a much higher level of illumination in the daytime. If the room does not exceed 20 feet in width, the best result will be obtained from

windows about 10 feet high on one side. If the rooms are much wider than this, windows must be provided on two sides, preferably the left and rear. The window area should not fall below 20 per cent. of the floor area when windows are located on two sides of a room, and not below 25 per cent. when on one side only. Suggestions as to control of daylight by shades are given, with illustrations of types of screen found satisfactory in actual working.

Photographs illustrating good and bad lighting systems with advice as to the improvement of the latter are given, as also methods of calculating the illuminating value of various systems of lighting. The pamphlet merits the serious consideration of all connected with the designing and maintenance of school and other educational buildings.

Ophthalmia neonatorum

We have drawn attention in these columns (December, 1917, p. 756), to the advisability of making provision in large towns for the collective treatment of cases of ophthalmia neonatorum, and to the steps taken in the desired direction under the impetus afforded by the recent Report of the Departmental Committee on the Welfare of the Blind. It will be recalled that the Local Government Board asked the Metropolitan Asylums Board to make provision for the hospital treatment of certain cases of the disease. We learn with satisfaction that the latter body has purchased for the sum of £22,553 from St. Pancras Union, St. Margaret's Home and adjacent freehold property in Kentish Town for the purpose in question, and that later the Board will establish a similar hospital south of the Thames. Questions of transport, the non-separation of mother from baby, the necessity of skilled attention as regards the recently confined mother, and the provision of a physician skilled in the care of infants, must be dealt with by the responsible authority.

Head-Surgery Units

From a communication in the *Ophthalmic Record* of October last by Dr. Casey Wood, we gather that the Surgeon-General of the United States Army, has created a special section in Surgery of the Head, divided into ophthalmology, oto-laryngology, brain surgery, and the plastic surgery of the face and head. This section is under the general direction of Lieut.-Col. T. C. Lyster, of the Surgeon-General's office, with whom are associated the following, forming a sub-committee of the General Medical Board of the Council of National Defence: Major Nelson M. Black (ophthalmology), Major H. P. Mosher (oto-laryngology), Major V. P. Blair (oral and plastic surgery), and Captain Charles Bagley, junior. Some of the best known specialists throughout the country have been commissioned by this committee and assigned to various cantonment and other

army hospitals as members of Head-Surgery Units. It is planned to have one hospital in France devoted entirely to head injuries, which already occupy some 20 per cent. of the beds available in base Hospitals, despite the use of steel helmets instead of the usual head-gear. The projected hospital, which is to be accessible by the various base hospitals, is to be provided with, perhaps, one thousand beds, and is to include laboratory, X-ray apparatus, shops, and a mechanical division for reconstructive appliances. It is hoped to follow the example of the British Army and to furnish the men with spectacles from a standard lens grinding department.

ABSTRACTS

I.—NUTRITION OF THE OPTIC NERVE

Behr, C. (Kiel).—On the nutrition of the optic nerve under physiological conditions and its connection with the intractability of tabetic atrophy. (Ueber die Ernährung des Sehnerven in physiologischer Beziehung und als Ursache der Unheilbarkeit der tabischen Sehnervenatrophie.) *Klin. Monatsbl. f. Augenheilk.*, September-October, 1917.

Behr describes some histological experiments on the structure of the optic nerve with special reference to their bearing on its nutrition. He points out that the ectodermal nervous connective tissue and that derived from the mesoderm are completely separated in the optic nerve, and that the blood-vessels of the central nervous system must be regarded as foreign bodies, as Weigert has already stated. Behr's researches consisted in the injection of Berlin blue into human nerves obtained immediately after death; the injection of fine emulsion of Indian ink into living dog's nerves; and in the use of various special staining methods in early atrophic nerves. The results obtained by all three methods corresponded, and he, therefore, only gives an account of the Berlin blue specimens at full length with the addition of some details from the Indian ink experiments. He states that the entire connective tissue structure of the optic nerve pial sheath, as well as septa, rests on a system of easily injected spaces which separates it from the nerve structure proper. Fine glial fibres come into close anatomical contact with the axis cylinders, and in this way bring the Berlin blue directly to them. The Indian ink preparations show that waste products in the optic nerve pass centripetally to the skull. The particles wander inside the nerve bundles and never pass out into the septa or through the pial sheath. Reproductions of photographs and

drawings accompany this part of the paper which is summed up as follows:

"The nutritive material in solution circulates in the blood-vessels running in the septa through the glial limiting membrane into the avascular nerve fibre bundle, where through the conduction of special glial fibres it is brought to the individual nerve fibres. The free tissue fluid then runs with the waste products inside the individual nerve bundles centralwards to the skull cavity, without making any connection with the perivascular lymph spaces or the intersheath space. It leaves the optic nerve first within the skull and then flows into the great collecting reservoir of the cerebro-spinal fluid. In the parenchyma of the nerve also there is a complete fluid current connected with the glial fibre system flowing from the periphery centralwards. During life naturally the conditions are more complicated, since the glial limiting membrane and the glial fibres probably exercise an important influence on the selection and partition of the nutritive material in addition to the purely mechanical flow."

Behr then proceeds to apply the facts detailed to the question of the intractability of tabetic atrophy. He points out that tabes is not a post-syphilitic affection, but a genuine syphilis of the nervous system. In ordinary syphilitic optic nerve atrophy there is a specific affection of the pial and arachnoidal sheath, and of the septal tissue. Occasionally also the vessels are affected in sympathy (neuritis peripherica, Wilbrand). In other words, it is primarily an affection of the mesodermal tissue. This is not the case in tabes, in which complaint the nervous and glial tissues are primarily affected. While in the former affection it is possible to get the curative agent in sufficient concentration in contact with the virus; in the latter the presence of the physiologically active limiting membrane of the glia prevents this. Behr found when working with Wilbrand and Sänger that minute lesions in the pial sheath were always present in early cases of tabetic disease of the nervous system.

Gennerich found that twelve times the highest safe dose of endolumbal injection in tabes was easily tolerated in cerebro-spinal syphilis. Behr considers that this is due to the action of the salvarsan in destroying the parasites being confined in the former to the mesodermal tissue, while in the latter the reaction takes place in the nervous tissue itself.

E. E. H.

II.—SYPHILITIC LEPTOMENINGITIS

Wilder, William H. (Chicago).—Optic neuritis from syphilitic leptomeningitis. *Trans. Amer. Ophth. Soc.*, Vol. XIV, Part ii, 1916, p. 614, and *Ann. of Ophthal.*, July, 1916.

Wilder begins by a description of syphilitic leptomeningitis as it affects the brain. The nerves of the eye are liable to be involved only when the meningitis affects the base of the brain, especially the region of the chiasma and the interpeduncular space. Lesions of the convexity, as a rule, give rise to changes in the optic nerve only when, by the development of tumour-like masses, the intra-cranial pressure is increased. In the basilar form the furrows and depressions of the base of the brain are filled with gelatinous, or firm, bacon-like new formations, thicker in some places than others. This new growth is found particularly in the vicinity of the chiasma, but may extend backwards even to the pons. It may surround the different parts of the optic tract and the motor nerves of the eye. The result may be a choked disc or a true inflammation of the nerve or its coverings, involving the intra-canalicular and even the orbital portion of the nerve. We may properly speak, therefore, of a leptomeningitis of the orbital segment of the optic nerve. As a rule, however, the intra-cranial part of the optic tract is the part affected. The process may commence with an oedema of the nerve or of its sheath, which would explain the sudden blindness in one eye or in both or in part of the field that is observed in some instances. These attacks are often transitory, but may recur. With the continuance of the mischief, there develops a perineuritis, associated with an interstitial neuritis, in which there is an infiltration of the nerve with round cells and the formation of granulation tissue, which later organizes and causes atrophy.

Uhthoff's figures dealing with the frequency of lesions of the optic nerve in syphilitic meningitis are quoted.—In 100 cases of syphilis of the central nervous system, choked disc or atrophy occurred 14 times, optic neuritis or subsequent atrophy 12 times, and simple atrophic change 14 times. In 52 of these cases the fundus was normal; but of these, 5 showed homonymous and 2 temporal hemianopsia. Uhthoff found that when choked disc occurred, it was caused in 65 per cent. of the cases by gummata of tumour-like dimensions, and in 23 per cent. by basilar meningitis.

As to the general symptoms, headache is one of the most constant symptoms, and at times may be accompanied by vertigo and vomiting. There may be convulsions or periods of unconsciousness. Psychic manifestations, disturbances of speech, paraesthesia, hemiplegia, deafness, or difficulty in swallowing have been recorded. But the most striking characteristic of such cases is the variability

and the inconstancy of the symptoms. This is illustrated by the eye symptoms. The suddenness of blindness, and at times rather prompt recovery, the appearance and disappearance of blind areas in the field, the paralysis of the motor nerves, followed by recovery, are examples.

The prognosis as to sight is usually uncertain, but will depend upon (a) the promptitude with which diagnosis is made, and (b) the damage suffered by the optic tract before effective treatment is begun. The hope of cure, Wilder tells us, is not to be given up even when blindness is complete.

The two following cases (given in abstract), which the author regards as instances of syphilitic leptomeningitis, illustrate the insidious nature of the disease, the sudden development of the eye symptoms, and the prompt response to treatment that may sometimes occur:

1.—In a female, aged 20 years, swelling on the nasal side of the eyelids ushered in loss of the nasal half of the right and of the upper half of the left visual field. Accompanying symptoms were slight headache and some mental confusion. No suspicion of syphilis in the parents, a Wassermann being negative as regards father and mother. The patient herself, however, yielded a positive result; the cerebro-spinal fluid was negative, although at a later stage a positive reaction was obtained. On admission, the eyelids were so swollen that they could be voluntarily opened but slightly. Slight exophthalmos. Abduction of the right eye about 35° and of the left eye 25° to 30°. Downward and especially upward movements of the eyes restricted. Pupils dilated to 8mm. and motionless to light. V.=zero (*sic*). Optic discs blurred and swollen to about 1 D., and surrounding retina somewhat oedematous. Retinal veins tortuous and double their normal width. Twenty-three days after admission, deafness, which after lasting for nearly a week, in the course of another week recovered. Treatment was by inunctions of mercury and by the intra-venous injections of neo-salvarsan, four in number. Within a week after treatment was instituted, the patient began to perceive light with the right eye. Three and a half months after admission, she was able to distinguish large objects in the right inferior visual field and to recognize colours. Two and a half months after that observation, the optic discs were very white, but colours were recognized with greater readiness, and she could read letters, about 2 cm. high, several feet from the eye. Four more injections of neosalvarsan were given, together with ascending doses of potassium iodide.

2.—A woman, aged 40 years, complained of headache, "spots" before the right eye, and loss of the right inferior nasal field. On examination, V.=20/20. Right pupil larger than the left, and relatively inactive to light. The right field showed a sector-like defect in the inferior nasal quadrant, and the colour fields were very much contracted. As regards the left eye, the field for white was full, but the fields for red and green were somewhat contracted. Four days later, patient became completely blind of the right eye. The pupil of that eye was motionless to direct light. No changes could be found in the fundus. Treated by the hypodermic injection of 0.3 c.c. of a 45 per cent. emulsion of mercury, although there was a report of a negative Wassermann. Prompt improvement. One hour after the injection, the headache disappeared. Four days after treatment was begun, she could distinguish movements of the hand close to her eye, and the right pupil reacted slightly to light. Six days after injection, V. was 20/70. The fields showed marked contraction for white and colours. A day or two later, the blood gave a positive reaction to Wassermann, while the reaction of the cerebro-spinal fluid was also positive. Treatment was continued, and fourteen days after it was started, V. was 20/30. The fields, taken about three weeks later, showed a return of white to normal, and a contraction as regards red and green. The fundus manifested no changes.

S. S.

III.—DISSEMINATED SCLEROSIS

(1) **Jocqs, R. (Paris). — Retrobulbar neuritis and disseminated sclerosis. (Névrite rétrobulbaire et sclérose en plaques.)** *La Clin. Ophtal.*, May, 1917.

(1) In the year 1902 **Jocqs** had a patient, a young man, aged 18 years, a myope, whose vision had previously been found by Jocqs to be normal, who now had a severe retrobulbar neuritis on the left side. At this time Jocqs himself came to the conclusion that this neuritis was due to chill, while Parinaud, who saw the patient in consultation, considered that infection from a slight nasal affection was the cause. In any case the vision returned nearly to normal in about a month. Nothing more was heard of the patient until the year 1911, when it was learned that he had disseminated sclerosis, and was partially blind. He died in 1912. Jocqs then recalled the work of others (Fleischer, Uhthoff, Peters), published (presumably) between the years 1902 and 1912, showing the importance of retrobulbar neuritis in the early diagnosis of disseminated sclerosis; and, thinking back, realized that his case had been of this type, where the neuritis antedates the sclerosis. Nine years elapsed between the two conditions.

After reference to the literature, and a considerable amount of quotation therefrom, Jocqs offers the following *ensemble* of the special signs which may cause one to suspect that a neuritis is related to sclerosis. Briefly, these are youth, unilaterality, the sensation of a veil over the sight, both at the very commencement of the neuritis and after the vision has recovered, frequent headaches before the appearance of the eye symptoms, a larger scotoma than that usually associated with toxic amblyopias, usually negative ophthalmoscopic findings, and short duration of the neuritic symptoms. The duration is not usually more than seven or eight weeks. In this particular case, while the disc was normal, there was a red spot at the macula, of the type seen in obstruction of the central artery.

ERNEST THOMSON.

(2) **Birch-Hirschfeld, Gertrud.—Contribution to the knowledge of ocular symptoms in disseminated sclerosis. (Beitrag zur Kenntniss der Augensymptome bei multipler Sklerose.)** *Neurologisches Zentralbl.*, Nr. 17, 1917; abstract in *Klin. Monatsbl. f. Augenheilk.*, September-October, 1917.

(2) **Birch-Hirschfeld's** paper is based on 86 cases of disseminated sclerosis, of which 71 showed ocular symptoms. Pallor of the temporal side of the disc occurred in 19 cases, mostly on both sides, but in four cases only on one side. Of these four the other eye in

three suffered from an incomplete diffuse atrophy. In 8 cases there was an incomplete optic atrophy, only on one side in 6 of them. In one case there was a porcelain whiteness of the temporal half. Two cases showed advanced general atrophy. Complete atrophy was never observed. In the two cases of advanced atrophy there was conspicuous amblyopia. In most of the cases the vision varied from 1/3 to normal. In five cases with well marked atrophic discolouration the vision was normal; in addition, defects of the field and colour sensation were not observed. Only in one case was retrobulbar neuritis with a central scotoma present. The authoress explains the rarity of this symptom by reason of its transitory nature and the fact that it makes its appearance at an early stage in the general disease. In 7 cases appearances were recognized indicating optic neuritis or retrobulbar neuritis. These cases are briefly referred to. In some cases it was an early symptom. In two cases there was a long free interval (9 and 13 years). Frequently there remained defects in the visual fields and marked reduction of the visual acuity. Flashings were complained of at the onset of the visual trouble in one case, and in another case appearances of dazzling, a rare occurrence in disseminated sclerosis. All the cases at the time of the optic nerve inflammation were under 30 years of age. In 4 cases there was a central scotoma (3 relative, 1 absolute), with atrophy of the papilla. Central scotoma with peripheral contraction of the field was only observed once. In 3 cases there was an irregular peripheral defect of the field. Defective colour vision (monocular red-green blindness) was found in one case. Muscular defects were found in 14 cases, with a previous history of diplopia in 13 of them. The abducens in 5, the oculomotor in 6, and the trochlearis in one case were the nerves affected. Of the oculomotor cases in two there was only a difference in the size of the lid aperture, while in one there was an incomplete ptosis. The internal rectus was the muscle most often affected. In the solitary trochlearis case the paralysis had lasted for two years. Weakness of convergence was noted in three cases. Nystagmus was present in 55 cases, mostly of a horizontal type. In one case the nystagmus was an early symptom. Slow and defective pupil reaction was noted in 12 cases. In 5 cases anisocoria was present. In several cases an inversion of the Argyll Robertson pupil was observed.

E. E. H.

IV.—PLUMBIC OPTIC NEURITIS IN CHILDREN

(1) **Gibson, J. Lockhart (Brisbane).—Notes on the relationship of opticians to the profession and to the public.** *Med. Jl. of Australia*, July 21, 1917.

(1) In the course of this communication, **Gibson** incidentally mentions the cases, not infrequently met with in Queensland, where young children suffer from optic neuritis and paralysis of one external rectus muscle due to lead poisoning, the poison being obtained, it is thought, from the powdery paint of verandah railings, and conveyed into the system by biting the nails or sucking the fingers. Prompt treatment yields encouraging results. The measures advocated include immediate lumbar puncture, and, internally, dilute sulphuric acid and salines, and, later, potassium iodide. Gibson sees, on the average, at least six or eight such cases every year.

S. S.

(2) **Plumbic optic neuritis.** *Med. Jl. of Australia*, July 28, 1917.

(2) This leading article directs attention to the neuro-retinitis occasionally found associated with lead poisoning. The observations of Lehmann (1890) and of Sir Thomas Oliver (1891) are mentioned. Lead poisoning appears to be more common among children in Queensland than in other parts of the world. It leads not only to the characteristic wrist- and foot-drop and colic, but in about one-quarter of the cases to optic neuritis. For example, of 262 children suffering from saturnism admitted to the Hospital for Sick Children at Brisbane, 67 had ocular symptoms. In 1897, J. Lockhart Gibson discovered the association of the eye conditions with lead poisoning. He also suggested, seven years later, that the poison was derived from lead carbonate used in paint for garden and verandah railings. The children handled the railings, picked up the powdery paint on their moist fingers, and conveyed it to their mouths by biting their nails or sucking their fingers. It is a curious circumstance that children with wrist- or foot-drop rarely show ocular manifestations. The *Journal* points out some objections to accepting Gibson's views as to the aetiology of the eye condition.

S. S.

(3) **Gibson, J. Lockhart (Brisbane).—The diagnosis, prophylaxis, and treatment of plumbic ocular neuritis amongst Queensland children.** *Med. Jl. of Australia*, September 8, 1917.

(3) **Gibson** points to the difficulty of diagnosing plumbic optic neuritis, when such cases occur singly, especially as they are not accompanied by wrist- and foot-drop, and a blue line on the gums is

by no means always present. Two new cases are mentioned, in one of which colic and vomiting and constipation had coincided with a squint, and were followed by post-neuritic atrophy of the optic discs. These cases may be confounded with gastritis, rheumatism, meningitis, or cerebral tumour. Repeated lumbar puncture, which has good results, shows that the cerebro-spinal fluid is under considerable pressure. With regard to the causation of the plumbism, Gibson adheres to his previously expressed views, namely, that it is due to children getting weathered paint from verandah rails on to their fingers and into their mouths. Freshly painted houses seldom yield cases. The employment of zinc white paint in lieu of lead is advocated. Gibson surmises that more cases occur in Queensland than in the other States, because there almost all the houses are of wood and are perched up on stumps, so that verandah rails are necessary, and that they, as a rule, are coated with lead paint. Perhaps, too, the climatic conditions lead to a more rapid weathering of the paint.

S. S.

V.—GRADENIGO SYMPTOM-COMPLEX

Guthrie, Douglas (Edinburgh) — Acute otitis media with paralysis of the sixth nerve (Gradenigo symptom-complex). *Edin. Med. Jl.*, July, 1917.

Gradenigo, of Turin, described the syndrome that bears his name as "an acute middle-ear suppuration accompanied by intense unilateral headache and paralysis of the abducent nerve." He collected fifty-three cases, only five of which were examined post-mortem, so that pathological data on the subject are scanty. Acute meningitis was the cause of death in all five cases. In three a localized abscess was found at the apex of the petrous bone, and in the remaining two a carious focus in the same situation. The path of infection from the tympanum to the petrous apex was demonstrated in two cases. In two instances the bone was remarkably "pneumatic" in structure. In Gradenigo's opinion, the pathology of the condition consists in a spread of infection from the tympanic cavity along the cells surrounding the bony part of the Eustachian tube, towards the apex of the petrous temporal. Here the sixth nerve is closely related to the bone, and, as it traverses the narrow cleft, known as Dorello's space, it is readily liable to suffer from the effects of pressure. It should be added that Dorello's space is a triangular osseo-fibrous canal bounded by the petrous apex, the posterior clinoid process, and the petro-sphenoidal ligament. In this region the sixth nerve is extradural and isolated from other

nerves, and it is easy to see how it may be pressed upon and involved in suppuration affecting the apical pyramidal cell. Spontaneous cure has been reported. Both abducens nerves may be affected. There are instances of otitis accompanied by paralysis of the sixth nerve on the opposite side (Furet). As **Guthrie** remarks, however, these bilateral and contra-lateral cases differ both clinically and pathologically from the type described by Gradenigo, and their aetiology is not yet clear.

The case met with by Guthrie was in a soldier, aged 21 years, who had suffered for three weeks from unilateral headache and pain in the right ear, accompanied by muco-purulent discharge. There was a history of otorrhoea in childhood, but no discharge since the age of 10 years. Temperature 100.2° F.; pulse 80. On examination, the inner half of the right meatus was found to be intensely red, and likewise the tympanic membrane. There was a large postero-inferior perforation through which protruded small polypi. Two days after admission the patient complained of a stabbing pain behind the right eye and of double vision. The optic discs were of normal appearance. There was an internal squint of the right eye, the abduction of which could not be carried out. Thirteen days after admission the radical mastoid operation was performed. The mastoid process was of distinctly "pneumatic" type, so much so that it was difficult to know where to stop in operating, as compact bone was nowhere encountered. A small area of dura, exposed during the operation, appeared to be healthy. About ten weeks after operation the ear was dry and clean, and the right eye could be almost fully abducted. Between ten and eleven months after operation the patient, who had meanwhile been discharged from the Army, reported that he was able to do light work on a farm, that he had lost all pain, that the ear was quite well, and, finally, that he sometimes had double vision.

S. S.

VI.—BLUE SCLEROTICS, BRITTLE BONES, AND DEAFNESS

(1) **Hoeve, J. van der (Groningen) and Kleijn, A. de (Utrecht).—Blue sclerotics, fragility of the bones, and deafness. (Blauwe sclera, broosheid van het beenstelsel, en gehoorstoornissen.)** *Nederl. Tijdschrift voor Geneeskunde* March, 1917.

(1) In 1915, in the *Ophthalmoscope*, Vol. XIII, p. 278, an excellent review of this subject was given by Sydney Stephenson who said that the symptom-complex included small stature and a

peculiar tendency to spontaneous fractures, dislocations, and sprains. **van der Hoeve** and **A. de Kleijn** found that deafness is also a chief symptom of the syndrome. From a family of 22 members in four generations, 17 were living, and the authors could examine 15 members; 11 showed the affection (among whom 9 were examined). Every one of these 11 had blue sclerotics, all were deaf—10 had broken one or more bones; only one of them, No. 15, a boy aged 11 years, had not yet fractured any bone. The patients were small and showed different affections of the fibrous structures, such as kyphosis, lordosis, scoliosis, crooked bones, sprains, and congenital anomalies, as astigmatism, syndactylism, etc.; embryontoxon was not found. Transmisson occurred from affected females. The patients were also examined bodily; neurological, gynaecological and internal examination showed no abnormalities. The glands with internal secretion were normal as far as they could be examined; the thyroid gland was not enlarged; sella Turcica with X-rays normal; menstruation regular.

Röntgen examination showed important alterations of the bony structure. The deafness was of the oto-sclerotic type; in the advanced cases complicated with labyrinthine disease.

The ancestors of this pedigree were not relations. The fact that till now deafness, with exception of one patient, reported by Adair-Dighton, has not been perceived in the individuals with blue sclerotics, does not mean that it was not present.

In the first place, the pedigrees of blue sclerotics are nearly all published by ophthalmologists, whose chief interest is not concerned in ear anomalies. Then the patients are not always aware of their deafness, for example, one of the patients, who thought his ears were quite normal, could not hear the whispered voice at three metres distance; and in the third place hereditary anomalies may remain unnoticed even by such experienced authors as Peters, who did not perceive the fragilitas ossium in his family with blue sclerotics; so we cannot wonder that an anomaly such as deafness, about which the patients, as a rule, do not like to speak, passes unobserved so long as it is not too marked.

In a second family the transmission occurred on the male side. The ancestors were not relations. The colour of the iris of the father (3) was blue, as was the case in all the patients in the first family; his wife had brown eyes, and both his affected sons also had brown eyes.

The son (6) was a good example of ignorance of the deafness; he was examined for the railway service, and, as nothing was observed, he was sure to be as healthy as possible. The examination showed plainly that he had a deafness of mixed type (sclerosis and labyrinth deafness); father (3) and grandfather (1) were quite deaf. All the members, except the aunt, had fractured some bones.

The father was very small and had hyphoscoliosis; he had an

unusually large gerontoxon corneae. The son had embryontoxon. The other members of the family could not be examined. When in December, 1916, some of the patients were shown to the Dutch Ophthalmological Society, one of the members of this Society said that he was called by an otologist to observe the dark colour of the sclera of a soldier who came in for treatment for deafness. When asked if he ever had broken any bones, the patient gave a history of brittle bones. So we see that deafness is one of the chief symptoms of the syndrome, blue sclerotics.

The point upon which H. Burrows has dwelt, that the fragility of the bones applies only to such members of the families as have actually inherited the blue sclerotics, was also observed by van der Hoeve and de Kleijn; the same was the case with the deafness. This cannot be wondered at when we realize that, as the thinness of the sclera is a congenital anomaly, the blue sclerotic is observed when the anomaly is there; the fragility of the bones, on the contrary, can be present unobserved, because an accident, although slight, is necessary to put it in evidence, and the deafness is progressive, so that it is not perceived before a certain age. So it may be that although all three symptoms of the syndrome are present, only the blue sclerotics are observed.

The authors agree with previous writers that the cause of the disease is congenital deficiency or weakness of the mesodermal structures throughout the body, and suggest that in these cases the deafness, as well from oto-sclerotic as from labyrinthine type, must be of mesodermal origin.

J. VAN DER HOEVE.

(2) **Bronson, E. (Edinburgh).—On fragilitas ossium and its association with blue sclerotics and otosclerosis.** *Edin. Med. Jl.*, April, 1917.

(2) For some time it has been known that certain members of particular families are subject to blue sclerotics and brittle bones, either in conjunction or as separate conditions. **Bronson** describes two such families; summarizes the literature in relation to fragilitas ossium; discusses the whole subject; and, finally, adds a bibliography.

The first family extended to four generations, and included an account of fifty-five individuals, of whom thirty-five were examined by the author. There was a tendency to:—(1) fractures, dislocations, and sprains; (2) a peculiar shape of the head; (3) grey-blue sclerotics; (4) deafness; and (5) small stature. As regards the sclerotics, of the fifty-five individuals included in the family, twenty-one had grey-blue sclerotics, and of that number twenty had suffered from fractures from more or less slight causes. Bronson favours the view that the curious colour of the sclerotics is

due to increased transparency, allowing the choroidal pigment to shine through. He dismisses Buchanan's observation that in one such case, on histological examination, the sclera was found to possess only one-third the normal thickness, on the ground that the patient probably did not belong to the group now under discussion. Indeed, to Buchanan's observation he opposes the fact that the microscopical investigation by Muir and Paterson of an undoubted case showed that the sclera was of normal thickness. He suggests that, when opportunity occurs, a quantitative chemical examination of the blue sclerotic should be made, and the results compared with the normal. As to the peculiar type of head seen in this family, the frontal and occipital bones were unusually prominent, and the suture boundaries of the latter could be made out by palpation in the majority of the cases. Seven members of the family had progressive deafness associated with fragilitas ossium and blue sclerotics. Examination of three of these patients by J. S. Fraser, showed that otosclerosis was the cause of the condition. It is of interest to note that deafness associated with hereditary fragility of the bones has only once been described previously (See No. 1 above).

The second family extended to three generations, and included an account of eight individuals, of whom seven had blue sclerotics, and of that number four suffered from fractures, and two from a tendency to sprains. There was a tendency in the family to (1) grey-blue sclerotics; (2) stunted stature; and (3) a peculiar shape of the head. There was, however, no history of deafness. In general, the characteristics of the head in this family were a frontal and supra-aural prominence, a slight tilting downward of the axis of the eye, a bending outward and downward of the ears, and a slightly underhung jaw.

S. S.

(3) **Spurway, John (London).—Fragilitas ossium, blue sclerotics, and otosclerosis.** *Brit. Med. Jl.*, June 16, 1917.

(3) The credit of having first drawn attention to the association of blue sclerotics and brittle bones is generally assigned to Eddowes, who wrote in 1900. **Spurway** now claims that in 1896 he wrote to the *British Medical Journal* describing the association in question.

S. S.

VII.—KERATITIS PUSTULIFORMIS PROFUNDA

Fuchs, Ernst (Vienna).—On keratitis pustuliformis profunda. (Ueber Keratitis pustuliformis profunda.) *Arch. f. Ophthal.*, Vol. XC, 1915.

Under this title **Fuchs** describes a rare form of keratitis which is characterized by the presence of yellow spots, resembling

little pustules, in the deepest layers of the cornea, and is accompanied by severe iritis with hypopyon.

He gives the clinical history of a number of such cases, together with a *résumé* of several that have been recorded by other writers.

The disease is rarely seen in its initial stage, but, he believes, commences as a rule with iritis. It is, therefore, impossible to state what are the usual primary changes in the cornea, although in two of his cases he observed a faint haze composed of deep-seated grey streaks or dots, such as are seen in parenchymatous keratitis, from which the yellow infiltrations developed.

When the clinical picture is fully developed, one sees in the cornea yellow spots, which are manifestly deep-seated, insomuch that it is not always certain whether they may not in part be formed by a deposit on the posterior surface of the cornea. The chief features of this infiltration, therefore, are its yellow colour and deep situation. The spots vary in size, shape, and position. They may be only as large as a pin's head, when usually several are present, situated often along the margin or arranged in a straight line or circle. Less frequently there is only one, somewhat larger in size, and usually occupying the centre of the cornea. Sometimes a grey or yellowish streak extends downwards from the spot, giving the appearance of pus running down on the posterior surface of the cornea from the infiltration to join the hypopyon. Round the yellow spots there is usually a fine grey halo, that passes gradually into the fine diffuse opacity which extends over the whole cornea, and which, when examined with the *loupe*, is found to be composed of very fine greyish dots. Moreover, fine, grey, deep-seated lines are often seen in the cornea. The surface of the cornea is always dull, its sensibility often reduced or abolished, but there is never any loss of substance.

This keratitis is always associated with a severe iritis. The iris is swollen and discoloured; small deposits of pus are often seen on its surface, especially after paracentesis has been performed. Synechiae are always present, while a membranous exudate in the pupil is often observed. The special feature of the iritis is the formation of a hypopyon which not infrequently fills the anterior chamber, and when evacuated by paracentesis rapidly reforms. The hypopyon is not composed of fluid pus, but consists of a viscid yellow mass that can only be removed from the anterior chamber by traction with forceps. In the majority of cases it is sterile. The evacuation of the pus usually alleviates the pain, but not for a long period, as the pus soon appears again. In two cases the puncture wound became infiltrated, but ulceration at this point did not supervene.

In many cases "keratitis punctata" is also present. This the author regards as specially noteworthy, as it very rarely occurs in

conjunction with a hypopyon, "keratitis punctata" being characteristic of chronic iritis, hypopyon of the acute form.

Owing to the opacity of the cornea, and the great amount of exudation into the anterior chamber, it is usually impossible to obtain a view of the vitreous chamber. In two cases, however, the author observed opacities in the vitreous, while in others the extreme reduction in vision, which was out of proportion to the changes visible, together with the diminished tension, indicated that the deeper parts of the eye were also affected.

The course of the disease is always tedious. The yellow spots may increase in size, or perhaps extend further in the substance of the cornea, or fresh ones may arise. The yellow infiltration of the cornea, however, never becomes so extensive as, e.g., in serpiginous ulcer; the prognosis, too, is more favourable, in so far as it never breaks down to form an ulcer, as one might expect from the yellow appearance. As a rule these spots gradually pass into dense, grey, deep-seated, often vascularized, opacities—a process for which a period of one or several months is necessary. The vision remains permanently much reduced, owing to the corneal opacities and the posterior synechiae and pupillary membrane arising from the iritis. In very severe cases flattening of the cornea ensues (in one case there was ectasia). Anterior synechiae often develop without perforation of the cornea (not reckoning the paracentesis, if performed). In the severest forms the process may result in a moderate degree of atrophy of the eye with mere perception of light.

In exceptional cases the disease seems to take a very mild form; in these the deep infiltrations in the cornea do not develop a yellow tint, but remain grey, and no hypopyon is formed.

The disease is usually unilateral (in two of Fuchs's cases bilateral). Treatment had scarcely any influence on its course; atropin, fomentations, and subconjunctival injections of sublimate solution (1 : 1,000) were employed. When the hypopyon became high it was evacuated by paracentesis, which was performed repeatedly when necessary, and usually relieved the pain till the hypopyon appeared again.

Keratitis pustuliformis profunda is a rare disease. The author estimates that he has seen only 30-40 cases over a period of 25 years. It affects elderly people, and occurs almost always in males (only two cases have been recorded in women). This is a striking fact when one considers that the question of injury, which is much more common in males, does not enter into the aetiology of the disease. No cases were observed in Fuchs's private practice, but this does not necessarily mean that the disease is peculiar to the poorer classes.

As to the aetiology, no information was obtainable from the history of the cases. Injury could with certainty be excluded. In the

reports of other writers the disease was preceded by an attack of herpes zoster ophthalmicus or influenza, or attributed to syphilis or tuberculosis. (In four of the author's cases there was a history of syphilis, but judging from his remarks it apparently had no bearing on the onset of this disease.)

As regards the differential diagnosis, although it is a purulent form of keratitis, the absence of ulceration on the surface of the cornea distinguishes it from the usual ulcerative forms, which are moreover superficial or if even deep-seated at first, as in ring abscess, come ultimately to the surface, which breaks down into an ulcer. As to the deep-seated varieties of keratitis, keratitis profunda differs from this disease by the striated lines and spots of which the opacity in it is composed, and these are grey not yellow. So too the spots in sclerosing keratitis are greyish in colour. Interstitial keratitis is a disease of youth. In all these hypopyon is absent. Disciform keratitis resembles most closely the disease under consideration, but in it the opacities are grey not yellow, often very faint and showing a sharply defined edge, and there is no hypopyon.

Four cases (of which three had been under the author's clinical observation) were examined microscopically; in two the changes were more advanced than in the others. It is unnecessary to give the anatomical findings in detail: it may be sufficient to note that in every case it was the deepest layers of the cornea that showed the greatest changes, the intensity of the inflammation diminishing from behind forwards, and that the pupillary area of the cornea was the part most affected. The exudation in the anterior chamber was mainly composed of polymorphonuclear cells and (except in one case examined after repeated paracentesis and showing staphylococcus albus) always free from bacteria. The inflammatory changes were confined strictly to the cornea and iris. In the two recent cases the changes in the iris were more marked and manifestly of longer standing than those in the cornea. In the two more advanced cases the anterior chamber was absent, although there was no evidence of perforation having occurred, this absence resulting in the total adhesion of the iris to the posterior surface of the cornea.

From a comparison of the pathological appearances in the iris and cornea and a consideration of the fact that the inflammation in the latter was less intense as traced from behind forwards, the author thinks it probable that the inflammation arose in the iris, and that from it toxins passed into the aqueous and attacked the cornea from behind.

In reviewing the whole subject Fuchs comments on the difficulties that arise on comparing the clinical with the anatomical picture of this disease: (1) the four cases microscopically examined showed a lack of uniformity in their appearances, indeed presented features quite different from one another; (2) the anatomical

findings by no means corresponded with the changes observed clinically, for, where he had noted a few circumscribed spots of yellowish colour, microscopical examination showed a fairly uniform infiltration, spread over the pupillary area of the cornea, which was not purulent in character at all; (3) from his clinical observations he had been convinced that the keratitis was primary, but histologically the changes in the iris were manifestly of older standing than those in the cornea, and therefore the iris must be regarded as the primary seat of the disease (this conclusion is confirmed by the cases which two other writers have recorded); (4) clinically one was in many cases compelled to infer that the deeper parts of the eyeball were seriously affected, but in the four examined microscopically, they exhibited changes that were only secondary and comparatively slight.

The number of cases submitted to anatomical examination is, however, as the author states, as yet very small, and further work in this direction may reveal other appearances that will diminish the importance of these differences.

In discussing the question of the route by which the cornea is invaded, Fuchs observes that there is nothing in the history or in the clinical or histological picture to point to an exogenous infection, and he gives his reason for the opinion that the cornea is attacked directly from the anterior chamber, not through the hypopyon, but by toxins in the aqueous. He is, however, unable to explain why they usually attack the central part of the cornea. The toxins can only come from the iris, but it is not every iritis, even when accompanied by hypopyon, that can produce the deep-seated keratitis above described. As to the aetiology of this iritis (or keratitis) some writers have cited syphilis or tuberculosis as the cause, but the author would regard it as still obscure, and thinks it is possible that the aetiological factor is not always the same, but that this clinical picture may arise from various causes.

THOS. SNOWBALL.

VIII.—OPHTHALMOSCOPIC EXAMINATION UNDER RED-FREE LIGHT

Affolter, A. (Zurich).—Ophthalmoscopic examination with red-free light. (*Ophthalmoskopische Untersuchungen in rotfreiem* Licht.) *Arch. f. Ophthal.*, Vol. XCIV, Part i, September, 1917.

A. Vogt, of Aarau (Switzerland), has already (in 1913), published experiments about examination of the eye in red-free light. Now **Affolter** publishes from Vogt's clinic some results concerning

this method. As source of light an arc lamp was used from which the red rays were taken away by a two-chambered filter, in the first chamber of which was put a 30 per cent. solution of copper sulphate, in the second a solution of 0·0078 erioviridin B. in 100 of water. A handy apparatus with this filter will soon be on sale by Zeiss, of Jena.

In this way red is absolutely taken away from the light, even from sunlight at noon. The red-free light contains especially blue and yellow rays.

The fluorescence of the lens in these rays makes it necessary for the examination of the macula lutea to dilate the pupil, especially in older people, where the fluorescence is strong. An eye should not be examined with the ophthalmoscope in this way for more than half a minute at one time.

Affolter's paper is accompanied by twenty-one splendidly coloured pictures, the reproduction of which was so difficult that the article, written in May, 1916, could not be published until September, 1917.

One of the principal results of this method of examination is that it is plainly shown that the intravital colour of the macula is yellow, so that the old question whether this colour is cadaveric or not is ended.

With the red-free light one can see many retinal reflexes; in the neighbourhood of the macula reflexes are seen, which are explained as folds of the superficial parts of the retina and are hereditary; this may perhaps be of interest for the star-figure in Bright's disease; at the other parts of the retina these folds have no typical place. Then the nerve-fibres of the retina are plainly seen; the way in which they encircle the macula lutea and turn to the periphery is visible.

The macula itself is much more distinct than in normal light; small vessels, otherwise invisible, reveal themselves by this method as black on light ground; little haemorrhages are more distinct, or can even be seen only in red-free light. The colour of the macula is sparkling yellow over an area equal to one-third of a papilla diameter.

In two albinotic patients no macula could be distinguished, neither the colour nor the constellation of the fibres, so that the rare histological finding is confirmed that albinos have no macula.

In eye diseases, Affolter found that in cases of retinitis the retinal reflexes were increased in number. He saw folds in and balls before the retina, probably myelin-balls, which will not be found histologically. Nerve-fibres were in retinitis thicker and more distinct, only distal from the morbid foci.

In eye diseases the macula can be more easily observed in red-free than in normal light.

Not only can the retina be better studied, but alterations of vitreous

body, lens, and cornea may under some circumstances be seen in red-free light, which cannot possibly be found with normal light.

This method of examination should not entirely replace the examinations under ordinary light, which suffices for the white foci in retinitis exudativa, retinitis proliferans, or other forms of retinitis. For small changes in the refracting media, and especially in retina and macula, the examination in red-free light will prove to be a valuable addition to our methods. J. VAN DER HOEVE.

IX.—NODULAR OPACITY OF THE CORNEA

Fuchs, E. (Vienna).—On nodular opacity of the cornea. (Ueber knötchenförmige Hornhauttrübung.) *Arch. f. Ophthal.*, Vol. LXXXIX, Pt. ii, 1915.

Fuchs sums up the literature on the pathology of nodular corneal opacity, and describes in detail the microscopical appearances found by himself in portions removed from the cornea of two patients.

The first patient was a man of 50 who had suffered from the affection for thirteen years. At no time had there been any pain or inflammation. Some slight improvement followed local treatment but was not maintained. Vision was reduced to finger counting at 2 metres. Fuchs performed a keratoplastic operation of the v. Hippel type, but without benefit; in fact, the graft became more densely opaque than the cornea had been. There was nothing in the family or personal history to indicate any cause for the disease.

The second patient was a man of 29 with a fourteen year history of progressive deterioration of sight without pain or inflammation. A brother and a sister had both suffered from the same complaint, and two other sisters had escaped. The man was in good health apart from his eyes. A keratoplastic operation on one eye improved the vision from finger counting at 2 metres to 6/60 and Jaeger 4 with a plus 2 D. sph.

The pieces removed were hardened in alcohol. They were about 0·3 mm. thick, thus corresponding to about half the thickness of the cornea. The appearances found in both were similar, and are given in great detail and well illustrated by a coloured plate. The main points are that in this affection two primary changes are present, i.e., the deposition of a substance that is often in layers immediately under the epithelium, and which gives an acidophile reaction, and a second basophile, granular substance in the cornea proper. Fuchs is inclined to think that the acidophile is a later product than the basophile substance, since the latter has been found in all the reported cases, while the former has not been always present. As

accessory changes, alterations in the epithelium with thinning and destruction of Bowman's membrane, and separation with occasional destruction of the corneal lamellae and possibly some swelling of these latter, have always been found.

Fuchs considers the affection to be of the nature of a dystrophy to be recognized by the deposition of substances insoluble in the tissue juices, and comparable to other similar processes found in old age, as a result of disturbances of general nutrition, and, finally, as a result of interference with the internal secretion of certain glands as in myxoedema. Since the first two causes can be eliminated in the disease under discussion, the cause must be sought in the third. Fuchs suggests that investigation on the lines of Abderhalden's researches might possibly lead to some result.

E. E. H.

BOOK NOTICES

Intensive Treatment of Syphilis and Locomotor Ataxia by Aachen methods. By R. H. HAYES. Second Edition, pp. 88, with three plates. London: Baillière, Tindall & Cox. 1917.

Hayes makes out a very strong case for the treatment of syphilis by the scientific use of mercurial inunction as carried out at Aachen. This method seems of particular value in late cases with nerve symptoms. He lays great stress on the necessity for extreme care in all the details of the treatment and the employment of only thoroughly competent rubbers. While admitting the use of the newer arsenical preparations, Hayes contends, and we think rightly, that, in the present state of our knowledge, these must be regarded as adjuvants and that our main reliance must be placed on mercury. There can be no doubt that properly controlled inunction is the safest and most efficient method of administering the drug. He states on page 35 that at Aachen the opinion was held that in tabes generally, and oculo-motor cases in particular, those which are going to respond satisfactorily to treatment ought to show some signs of progress by about the seventieth day. Several illustrative cases of successful treatment of nervous syphilis are related in detail, and three plates to illustrate the methods of inunction are included in the volume.

Hayes points out that arrangements have now been made to carry out the full Aachen treatment in London.

The book is of distinct value as a reliable guide to what is

probably the most satisfactory treatment for syphilis at present available.

E. E. H.

Three clinical studies in tuberculous predisposition. By W. C. RIVERS. 272 pp. London: George Allen & Unwin, Ltd. 1917.

Rivers, in his position as tuberculosis officer to the Barnsley District, Yorkshire, has been able to keep under observation for continuous periods a large number of patients with various forms of tuberculosis. Difficulties in age distribution, etc., have caused him to confine his work in the present volume to pulmonary tuberculosis, but he has ground for thinking that the three anomalies dealt with are over-frequent in surgical tuberculous patients as well. The three anomalous conditions which he has found associated in an abnormally large number of cases of pulmonary tuberculosis are: Ichthyosis, nasal abnormality, and squint. With the first two we, as ophthalmic surgeons, are not concerned.

The proportion of squints in 500 cases of consumptives was found to be 1·2 per cent. A similar sample, taken from 900 persons of the same social class, showed only 0·4 per cent. Squint is taken to mean only the non-paralytic concomitant variety. In none of his cases was any family history of squint obtained. The ordinary history of development of squint in early life was noted in his cases, and this, of course, occurred long before the appearance of any symptoms of tuberculosis. No details are given of vision or refractive error, a serious omission in a wide generalization of this kind. A second point in connection with his squint cases was, that out of twenty no less than sixteen squinted with the left eye. Rivers suggests that there may be some connection with left-handedness in general and other stigmata of degeneration. He quotes various authors, such as Lombroso, Voisin, Féré, Hirschfeld (a Berlin writer on homosexuality), and others in support of this view. He concludes the chapter as follows:—

"Squint, then, appears to be sometimes a mark of mental deficiency, or of a tendency, personal or familial, to certain bodily anomalies or malformations. . . . Such active constituent may be some associated malformation, of which squint may be the stigma. . . . Sufficient, meanwhile, to record that, according to our findings on our evidence, there is undoubted association between concomitant strabismus and consumption, of predisposition to which latter disease squint forms a sign."

The reviewer considers that the evidence is hardly sufficient to support such a conclusion, based, as it is, on only 500 cases.

E. E. H.

Localization by X-rays and Stereoscopy. By SIR JAMES MACKENZIE DAVIDSON. London: H. K. Lewis and Co., 1916. Price, 7s. net.

The title of this book, coming from the pen of so accurate a worker as Sir James Mackenzie Davidson, with whose name one always associates the localization of foreign bodies in the eyeball and orbit, should recommend it to all workers in X-rays.

The preface starts by saying: "It is nearly twenty years since the author first described in the Medical Press the system of exact localization by means of X-rays." . . . "The system he advocates has stood the test of time." One naturally at once turns to the chapter on "The Localization of Foreign Bodies in the Eyeball and Orbit," which is very clear and well illustrated. The chapter should be read by all who are doing X-ray work in military hospitals, where there are many soldiers with metal in the orbit. The various experiments described in the book are most interesting and instructive.

Stereoscopy, the telephone probe and electro-magnet are also dealt with. The book is well illustrated with several stereoscopic photographs.

R. H. SANKEY.

American Journal of Ophthalmology. Third Series. Vol. I, No. 1. January, 1918. 7, West Madison Street, Chicago, Illinois. Single copies, 1 dollar.

The first number of the *American Journal of Ophthalmology*, dated January, 1918, has reached this office. It is a substantial magazine of 96 pages, the subscription to which is 10 dollars a year. The number includes two coloured plates, besides black and white illustrations. Nine original papers, abstracts, society proceedings, editorials, book notices, news items, an index, and a digest of ophthalmic literature form its contents. The British collaborators are R. H. Elliot and A. A. Bradburne and F. P. Maynard (India) and F. C. Tooke (Canada). The *Journal* (to which we wish every success) is edited by Edward Jackson, who formerly conducted the *Ophthalmic Year Book* and *Ophthalmic Literature*, two of the seven periodicals incorporated in the new venture.

We heartily congratulate American colleagues upon the enterprise which has led to the production of this periodical. We may be allowed to express the hope that the amalgamation may yet include all the American ophthalmic periodicals.

S. S.

NOTES

Deaths

WE regret to announce the death of Kenneth Mackenzie Scott, which occurred suddenly on February 19 in a London nursing home, after an operation for appendicitis. He was born in 1864 at Morton, Bingley, Yorkshire, and was the only son of Thomas Graham Scott, of Edinburgh, and Ann, daughter of James Whitley, of Morton. He was educated at the Edinburgh Academy, Edinburgh University, and King's College, London. He graduated at Edinburgh University in 1887, taking honours in the final examination for the M.B. Scott became lecturer on ophthalmology, and afterwards professor of that subject in the Egyptian Medical School, Cairo, and ophthalmic surgeon to the Kasr-el-Aini Hospital, a post he held from 1889 to 1899. During his sojourn in Cairo he was organiser and honorary secretary of the Blind School. He was the recipient of the Imperial Ottoman Order of the Osmanieh (fourth class), in recognition of his Egyptian services. After leaving Egypt and settling in London, he was appointed assistant ophthalmic surgeon at the West London Hospital and taught in the Post-Graduate College (1907-9). Other posts held by him included that of consulting ophthalmic surgeon to St. Mary's Hospital for Women and Children, E., and of medical administrator and ophthalmic surgeon to the City of London Red Cross Hospital. He was a member of the Ophthalmological Society of the United Kingdom and of the Section of Ophthalmology of the Royal Society of Medicine. Among his published works were "The Radical Operative Treatment of Entropion and Trichiasis," "Refraction and Visual Acuity"; and his contributions included communications to the ***Ophthalmic Review***, the ***Annals of Ophthalmology***, the ***Caledonian Medical Journal***, and the ***West London Medical Journal***.

Don Miguel Benassar y Janer, oculist to the Civil Hospital of Palma, in the island of Majorca, died of heart disease on October 7, 1917.

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Appointments

WE are glad to observe that Mr. J. B. Lawford, surgeon to the Royal London Ophthalmic Hospital, has been appointed a member of the Advisory Committee of the Local Government Board on the care and supervision of the Blind. The appointment was made on the nomination of the Royal Society of Medicine.

The following officers of the Madrid Ophthalmological Society were elected on November 8, 1917 : *President*, M. Garcia ; *Vice-President*, C. Pulido ; *Treasurer*, J. A. Esteve ; *Secretary*, F. Catalina.

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Illuminating Engineering Society

AT the January meeting of this Society a paper was read by Mr. L. Gaster suggesting that the Society should obtain statistics to show the prejudicial effects upon health and eyesight of inadequate and badly arranged lighting. The Society determined to undertake an investigation into the whole question.

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Mission of American Specialists

TRUE to their policy of foresightedness, the Americans have taken steps to obtain first-hand information concerning the experiences of their Allies. A Mission was sent to Europe some few months ago for the study of certain medical points. It consisted of Colonel T. C. Lyster (Army Medical Corps), Major Harries P. Mosher (laryngologist), Major J. H. Jones (otologist), together with Major G. E. de Schweinitz, representing ophthalmology. The particular points that engaged the attention of the Mission included, among other things, the surgery of the eye. After visiting France and Italy, the Mission recently came to London, where it studied the methods adopted at St. Dunstan's Hostel for Blinded Soldiers and Sailors, and had opportunities for observing more purely ophthalmic work.

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French Ophthalmological Society

IT is announced that the discussion at the meeting of the French Ophthalmological Society, which will be held in Paris on May 6, 1918, will be upon "X-rays and radium in ophthalmology." It will be opened by Dr. Terrien.

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Oxford Ophthalmological Congress

AT the forthcoming Oxford Ophthalmological Congress a discussion on "Ophthalmology and the War," will be opened by Sir William Collins, K.C.V.O., M.P.

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The Dickens Fellowship and the Blind.

IT may not be generally known what good work for the Blind is in process of accomplishment by the Dickens Fellowship by the provision of the novelist's works in Braille type, a costly undertaking on account of the bulk of the books. Some volumes have already been published, the last to appear being "Barnaby Rudge," at a cost to the Fellowship of £105. If sufficient funds are forthcoming, it is hoped to complete the series. Contributions towards this desirable end may be sent to the Hon. Treasurer of the Dickens Fellowship, 14, Clifford's Inn, E.C. 4.

FUTURE ARRANGEMENTS

	1918	
Midland Ophthalmological Society	April 9	Birmingham
Ophthalmological Society of the United Kingdom	May 2-4	London
French Society of Ophthalmology	May 6	Paris, 51, Rue de Clichy
Midland Ophthalmological Society	June 4	Wolverhampton
Section of Ophthalmology, Royal Society of Medicine	June 12	London
American Ophthalmological Society	July 9-10	Eastern Point, New London, Conn.
Oxford Ophthalmological Congress	July 10-12	Oxford.